

A revision of the genus *Dicerca* in North America (Coleoptera: Buprestidae)

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Abstract: The genus *Dicerca*, in the tribe Buprestini, is placed nearest the genera *Poecilonota* and *Trachykele* based on larval and adult morphology. The external morphology of 8500 specimens including the genitalia of the males, the geographical distribution, and host plant data reveals 27 valid species which are arranged in 7 groups. Twenty-one new synonymies are listed, *D. frosti* Nelson is reduced to a subspecies of *D. callosa* Casey, *D. cajonensis* Knull is elevated to specific standing and the subspecies *D. tenebrosa knulli* is described as new. Figures of all species not previously well illustrated are given and a key to the species and subspecies is included.

Introduction

The North American species of *Dicerca* have been in a confused taxonomic state for many years. The last revision was by T. L. Casey (1909) and included 46 new species and subspecies names, mostly based on minor structural variations. This and confusion about the status of some earlier described species have made it increasingly difficult to assign names with any confidence. Several species are secondary invaders of trees commonly used for lumber, shade, or fruit so are considered of some economic importance.

More than 8500 specimens of *Dicerca* were studied and the types, or specimens compared with the types, were examined for all the species involved in this study with the exception of those that have been lost. Based on a study of the external morphology and the male genitalia in correlation with distributional and host plant data 27 species are treated as valid in this paper. Full drawings of each species are presented except for *D. querci* and *D. cajonensis* which have been figured recently by Knull (1941 & 1944) and the three Mexican species. Since no material of the endemic mexican species was available to the writer, those species are included on the basis of examinations made by Dr. W. F. Barr of the material in the British Museum of Natural History. Dorsal and ventral views of the male genitalia and certain other distinguishing parts are figured and a key is included to aid in identification. The abbreviations for institutions used in this paper are indicated in the acknowledgements.

References that are listed under "Literature Cited" are abbreviated to author, year and page number where listed under the genus or species.

Biology

The adults of *Dicerca*, as with most other members of this family, are sunlovers and can be found during the warm months flying to and from or sitting on the logs, trunks and limbs or foliage of their host plants and sometimes resting on other plants. The eggs are laid in cracks or crevices in the bark or wood and the larvae mine the sapwood or heartwood. The larvae of most species work in recently dead wood or in dead parts of living trees, but at least one species, *D. pugionata* Germ., works in apparently healthy living witch-hazel, Knull (1920), ninebark, and alder, Knull (1925) and Craighead (1950). While no data on development is available for North American species, those of Europe ordinarily take three years according to Schaefer (1949) and Bílý (1972) reports the life-cycle of *D. berolinensis* (Hbst.) lasts at least 3—7 years in Czechoslovakia.

Many of the species hibernate as adults under loose bark (Knull, 1920, 1922) or about the bases of trees (Stromberg, 1894). It is not known whether or not these specimens reproduce during the second year. Bílý (1972) indicates that in Europe, *D. berolinensis* (Hbst.) hibernates as last instar larvae, pupae, or adults.

Most of the species of *Dicerca* are limited to feeding in closely related trees with *D. querci*, *D. spreta*, and *D. asperata* possibly confined to one host. However, some species e. g. *D. divaricata* and *D. horni* utilize a wide variety of deciduous trees and *D. tenebrosa* works in a fairly wide range of conifers. Rearing records are unknown for the following species: *D. dumolini*, *lugubris*, *callosa*, *juncea*, *mutica*, and *cajonensis*.

Geographical Distribution

The genus *Dicerca* is holarctic in its distribution and contains 43 species, 16 species from the Palearctic Realm (Obenberger, 1930) and 27 species from the Nearctic Realm. Three of the nearctic species, *D. aeneovaria*, *D. inconnexa*, and *D. propinquua*, are found in the mainland of Mexico.

Two of the twenty-four nearctic species found north of Mexico are widely distributed in Canada and the USA, *D. tenebrosa*, except for central

and south central USA and *D. tenebrica*, except for the central and southern states. Four species are confined to eastern North America: *D. tuberculata*, *D. divaricata*, *D. lurida* and *D. caudata* (the last as far west as the Rocky Mts.); one, *D. callosa*, in western and northeastern USA and throughout Canada, and *D. lugubris* in northern and eastern Canada and northern USA. There are six species distributed in the eastern USA: *D. punctulata*, *D. pugionata*, *D. asperata*, *D. obscura*, *D. lepida*, and *D. mutica* (the last known from only four specimens). One species, *D. dumolini*, appears restricted to northeastern USA and Quebec, and two, *D. spreta* and *D. juncea*, are found in the southern states. There are two species, *D. horni*, and *D. pectorosa*, found from the Pacific states into the Rocky Mountain states and five species along the Pacific coast: *D. crassicollis*, *D. sexualis*, *D. hesperoborealis*, *D. cajonensis*, and *D. querici*, the last two limited to southern California.

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Classification

Genus *Dicerca* Eschscholtz

Dicerca Eschscholtz, 1829, Zool. Atlas, 1: 9; Spinola, 1837, Ann. Soc. Ent. Fr., 6: 101; Mannerheim, 1837, Bull. Soc. Nat. Moscow, 7: 53; Faldermann, Franz, 1838, Nouv. Mem. Soc. Imp. Nat. Moscow, 4: 143; Chevrolat, 1838, Rev. Ent. 5: 65, 66; Stephans, 1839, Man. Brit. Coleopt., pp. 171, 172; Melsheimer 1845: 142—145; Redtenbacher, 1849, Fauna Austriaca, p. 276; Imhoff, 1856, Einf. Stud. Koleopt., 2: 46; Fairmaire, 1856, Faune Ent. Francaise, 1: 139; Lacordaire 1857: 35; Kiesenwetter, 1857, Naturg. Ins. Deutschl., 4: 32 (Sub-gen. of *Buprestis*); Calwer, 1858, Käferbuch, p. 367; Duval, 1859, Gen. Coleopt. d'Eur., p. 97, Pl. 23, Fig. 114; LeConte 1860 (1859): 193; 1861, Cl. Coleopt. N. Amer., p. 152; C. G. Thomson, 1864, Skand. Coleopt., 6: 11; Marseul, 1865, L'Abeille, 2: 134; Chevrolat, 1867, Ann. Soc. Ent. Fr., 7: 577; C. G. Thomson, 1868, Skand. Coleopt., 10: 85; Reitter, 1870, Verh. Naturforsch. Ver. Brünn, 9: 98; 1871, op. cit., 10: 114; E. Saunders 1871: 35; Crotch 1873: 84—88; Redtenbacher, 1874, Fauna Austriaca, Dritte Aufl., p. 505; Reitter, 1877, Verh. Naturforsch. Ver. Brünn, 16: 199; Perris, 1877, Larves Coleopt., p. 132 (biology); Hubbard & Schwarz 1878: 636; Altum, 1881, Forstzool., 3: 119; LeConte & Horn 1883: 196; Kerremans, 1884, Ann. Soc. Belg., 28: 135; Blanchard 1889: 30; Chittenden 1889: 217, 219; Waterhouse 1889: 11; Seidlitz, 1891, Fauna Baltica, Edit. II, pp. 34, 155; 1891, Fauna Transsylv., pp. 34, 167; Kerremans 1892: 85; Xambeau, 1893, Rev. d'Ent., 11: (biology); Hopkins 1893: 181; Kerremans, 1893, Ann. Soc. Ent. Belg., 37: 108; 1894, Ann. Soc. Ent. Belg., 38: 102, 106, 115; Judeich & Nitsche, 1895, Lehrb. Mitteleur. Forstinsectenkunde, 1: 316 (biology); Hopkins, 1899, W. Va. Agr. Exp. Sta., Bull. 56, p. 436; Everts, 1901, Coleopt. Neerl., 2: 74, 75; Ulke 1902: 21; Kerremans 1903: 130; Reitter, 1904, Weiner Ent. Z., 23: 21—24 (Rev. of Palearctic species); Felt 1906: 442, 457, 656, 657 (biology); Heyne & Taschenberg, 1907, Exot. Käfer, p. 137; Casey

1909: 128; J. B. Smith, 1910 (1909): 292; Blatchley 1910: 780, 781; Reitter, 1911, Fauna Germ., 3: 179, 182; Jakobson, 1912, Zuki Rossiji, pp. 786, 787; Kuhnt, 1913, Illus. Best. Käfer Deutschl., pp. 647, 648; Sorauer & Reh, 1913, Handb. Pflanzenkrankheiten, p. 485 (biology); Martínez, 1914, Trabajos d'Mus. Nac. Cien. Nat., Ser. Zool., No. 11, p. 200; Calwer & Schaufuss, 1916, Käferbuch, Edit. 6, p. 683; Burke 1917 a: 4, 6, 7, Pl. 4, Fig. 1 (larvae); 1917 b, Jour. Econ. Ent., 10: 326; Chamberlin, 1917 a, Ent. News, 28: 129, 130; Obenberger, 1919, Časopis Čs. Spol. Ent., 16: 34; Leng 1920: 180; Knull 1920: 5; Bedel, 1921, Faune Coleopt. Bassin Seine, 4: 172, 176; Knull 1922: 80; Escherich, 1923, Forstinsekten Mitteleur. II, pp. 133, 139 (biology); Graham, 1923, 19. Rep. Minn. St. Ent. (1921—1922) pp. 22—40 (biology); Chamberlin 1924 a: 185; Hatch, 1924, Mich. Acad. Arts & Letters, 4: 571; Knull 1925: 10—16; Fisher 1925: 129, 130; Essig 1926: 396, 397 (biology); Fall 1926: 192, 193; Chamberlin 1926: 179; Leng & Mutchler, 1927, Cat. Coleopt. Amer. N. of Mex., Suppl., p. 30; Leonard 1928: 355—357; Chamberlin, 1928, Pan-Pac. Ent., 5 (2): 93; Sorauer & Rey, 1928, Handb. Pflanzenkrankheiten, 2. Aufl., p. 137 (biology); Chamberlin, 1928, Pan-Pac. Ent., 5 (2): 114; Porta, 1929, Fauna Coleopt. Ital., 3: 381, 385; Théry, 1930, Mém. Soc. Sci. Nat. d'Maroc, No. 19 (1928), pp. 245—247, 557; Obenberger 1930: 314—340; 1933, Bull. Inst. Roy. Hist. Nat. Sofia, p. 50; Leng & Mutchler 1933: 29; Van Dyke 1934: 90, 91; Brimley 1938: 171; Blackwelder 1939, 43; Beer & Hatch 1941: 103; Théry, 1942, Faune Fr., Bupr., pp. 45, 46; Van Dyke, 1942, Proc. Calif. Acad. Sci., 24 (3): 114; Blackwelder 1944: 312; Schaefer, 1947, Bull. Men. Soc. Linné, d'Lyon, No. 7, p. 142 (larvae); Knowlton & Wood 1948: 43; Blackwelder & Blackwelder 1948: 20; Schaefer 1949: 149—152; Kajihiro & Millspaugh 1950: 542; Craighead 1950: 195 (biology); Keen 1952: 189, 190 (biology); Rikhter, 1952, Fauna of USSR, Coleopt. (Bupr.), pp. 111—113; Franklin & Lund 1956: 24, 25; Arnett 1960: 484, 486; Tassi, 1962, Mem. Mus. Civ. Stor. Nat., 10: 218; Descarpentries & Villiers, 1963, Rev. Fr. d'Ent., 30: 262, 263; Schaefer, 1963, Faune Terr. d'Pyrénées-Orient., Fasc. 7, p. 13; Pochon, 1964, Ins. Helvetica, 2, Coleopt., Bupr., p. 24; Schaefer, 1964, Ext. Ann. Soc. d'Hort. & Hist. Nat. d'Hérault, 104: 199; Barr 1971: 58—60.

Latipalpis Solier, 1833, Ann. Soc. Ent. Fr., 2: 287 (part).

Argante Gistel 1834: 10; Kiesenwetter, 1857, Naturg. Ins. Deutschl., 4: 39 (Subgen. of *Buprestis*); Gutfleisch & Bose, 1859, Käfer Deutsch., p. 338; C. G. Thomson, 1868, Skand. Coleopt., 10: 85; Porta, 1929, Fauna Coleopt. Ital., 3: 385; Schaefer 1949: 153 (Subgen. of *Dicerca*); Rikhter, 1952, Fauna of USSR, Coleopt. (Bupr.), pp. 107, 108.

Stenuris Kirby, 1837, Richardson's Fauna Bor.-Amer., 4: 154—156 (Subgen. of *Buprestis*); Melsheimer 1853: 62.

Buprestis Laporte & Gory 1837: 93—108, Pls. 24—27 (sixième division); Schiödte, 1864, Naturh. Tidskr., 3: 491, 506.

Body elongate, oval, moderately convex, generally strongly acuminate apically; brassy, cupreous or dull brown to black in color, sometimes with greenish hue.

Head vertical, flat or slightly impressed, rugose; front not narrowed by insertion of antennae; eyes widely separated, less so on vertex; clypeus short, emarginate; antennae received in large triangular depressions ridged on two sides. Antennae moderately slender, first joint rather robust, second and third joints shorter and more slender, fourth slightly to distinctly serrate; apical joints from fifth serrate, each with poriferous depression on underside at apical margin; apical joint of maxillary palpi enlarged, triangular or oval.

Pronotum transverse, sides variable, anterior margin arcuately emarginate, basal margin bisinuate, posterior angles acute. Scutellum small, rounded or feebly transverse.

Elytra elongate, sides slightly sinuate, acuminate posteriorly and usually prolonged, apices variable.

Venter with anterior margin of prosternum truncate, sinuate or bilobed; prosternal process concave, flat or convex, not strongly constricted by anterior coxal cavities, narrowed at apex. Sternal cavity formed by mesosternum and metasternum; mesosternum divided, lateral parts elongate; metasternum rounded anteriorly, feebly grooved at midline. Antecoxal piece rounded anteriorly, with median groove or carina. Posterior coxae strongly dilated medially, anterior margin sinuate, posterior margin broadly, arcuately emarginate, sinuate medially. Legs moderately robust; pro- and mesofemora more strongly swollen than metafemora; protibiae straight, expanded apically; mesotibiae straight, slightly longer than protibiae; metatibiae slightly arcuate, distinctly longer than anterior two pairs; tarsi broad, first joint of metatarsi not or only slightly longer than second joint. Abdomen with distinct sutures between sternites; first sternite flat or concave at middle; apex of last sternite variable.

Type species: *Buprestis aenea* Linnaeus (type by subsequent designation, Casey, 1909).

Larva: The larvae of *Dicerca* have the general characteristics of the "flatheaded" part of the family and, according to Burke (1917), are characterized by: dorsal plate with an inverted V with a broad reticulated apex, surface of plate rather dull but without distinct asperities; last body segment rounded, without a pair of pointed and hard prolongations. Both Schaefer (1949) and Bily (1972) record the rudiments of legs on the larvae of at least some species of European *Dicerca*, and Bily also describes a larva of *D. bero-linensis* (Hbst.) with some pupal characteristics.

Relationships of genus: The genus *Dicerca* belongs in the tribe Buprestini, used by LeConte & Horn (1883) for what Lacordaire (1857) called "Buprestides vrais". In North America the most similar genera ap-

pear to be *Poecilonota* and *Trachykele*. The characteristics that distinguish *Dicerca* from others in the tribe are: antennae inserted in large triangular depressions ridged on two sides, segments with sensory pores in depressions on underside at apex; last joint of maxillary palpi enlarged, triangular or oval; pronotum closely punctate or depressed on midline; scutellum small, round or oval; metacoxa strongly dilated within; first joint of metatarsi subequal to second. Keys to separate the genera appear in Arnett (1960). The larvae of *Dicerca* are most similar to those of *Trachykele* but the latter differ in having the dorsal marking an inverted Y with a depressed, shining, reticulated, diamond-shaped area surrounding the apex.

Discussion of Characters

The general body shape varies from the narrow strongly convex shape of *D. juncea* and *D. lurida* to the robust shape of *D. aeneovaria*, *D. querci* and *D. cajonensis*. In general color, the common brassy-cupreous becomes iridescent green in *D. tuberculata* and brassy-brown in *D. dumolini* but within most species the color varies too much to be distinctive. The abundant long body hair (setae) helps to distinguish the *horni* group.

Head. The arrangement of the frontal callosities which are scattered in some but form a transverse ridge in others is useful in separating some species. The relative lengths of the second and third antennal segments has been used in separating groups and the shape of the terminal segments helps distinguish *D. callosa callosa* from its subspecies *D. c. frosti*.

Pronotum. Variation in the lateral margins from not expanded in some species to strongly expanded in others, and the degree of development of the median channel are useful characteristics in separating species.

Elytra. The bidentate elytral apices is an obvious characteristic used to separate the *lurida* and *aeneovaria* groups from other groups and the degree to which the apices are produced is also useful in distinguishing groups and species. Striae are evident in some species but inconspicuous or confused in others. The arrangement and degree of development of the dorsal callosities and the areas of punctures in relation to callosities are of use in distinguishing species.

Venter. The prosternal process is concave in most species but may be flattened in the females of some and in *D. mutica* the convex prosternal process is one of the most distinctive features. A distinguishing feature of the *aeneovaria* group is the toothed anterior margin of the prosternum. The me-

sotibia of the male is either simple or bears a variously developed tooth and this is useful in separating some closely similar species. Midline modifications of the antecoxal piece are useful in separating some of the species in the *tenebrica* group. The notch and tooth in the hind margin of the metacoxal plate helps distinguish *D. obscura* and *D. juncea* from *D. lurida*. In most species the apex of the last visible abdominal sternite is rectangularly emarginate in the male. It is tridentate or entire in the female, a useful character in distinguishing some species of the *tenebrosa* group. The last visible abdominal sternite is truncate in both sexes in *D. pectorosa*, which helps to separate it from other species.

Male genitalia. The general shape and relation of the parameres (lateral lobes) to the penis (median lobe) is useful in distinguishing the species.

Relationships of Species

LeConte (1860) presented the first revision of the North American species of *Dicerca* and arranged them in three groups. Casey (1909), the last to revise the genus, used the basic groupings of LeConte but subdivided those and added a group for *D. horni* resulting in eight groups.

In the present study the species are arranged in 7 groups similar to the Casey groups. The first or *tenebrosa* group corresponds largely to LeConte's group III and Casey's group V and contains seven species: *D. tenebrosa*, *D. crassicollis*, *D. sexualis*, *D. lugubris*, *D. punctulata*, *D. dumolini* and *D. tuberculata*. This group, probably the most natural of the groups, has segment two of the antenna distinctly shorter than segment three, the sides of the pronotum generally strongly expanded, the body hair inconspicuous, the dorsal sculpture generally strong, the elytra weakly to moderately produced, the apex entire to slightly emarginate, the last visible abdominal sternite emarginate in males, tridentate or entire in females, and its hosts are Gymnosperms. The second or *pectorosa* group (Casey's group VII) contains one western species, *D. pectorosa*, with many characteristics of the *tenebrosa* group but differs in having the last visible abdominal sternite truncate in both sexes and in having Angiosperms as hosts. The larvae of all of the following groups work in Angiosperms also (with the possible exception of the *aeneovaria* group for which no data is available). In the third or *tenebrica* group (Casey's group III) are five species: *D. callosa*, *D. tenebrica*, *D. hesperoborealis*, *D. divaricata*, and *D. caudata*. These have segment two of the antenna subequal to segment three, the dorsal sculpture generally weak, the

clytral apices usually strongly produced and entire or slightly truncate. The fourth or *aeneovaria* group (not included in either LeConte's or Casey's studies) contains three species: *D. aeneovaria*, *D. inconspicua*, and *D. propinquua* which are characterized by having the anterior margin of the prosternum toothed and the apices of the elytra emarginate and bidentate. The fifth or *lurida* group (Casey's groups I, II, and VI) includes seven species: *D. pugionata*, *D. lepida*, *D. asperata*, *D. spreta*, *D. juncea*, *D. obscura*, and *D. lurida* which have the elytral apices strongly bidentate and generally weakly produced (except *pugionata*). Group six or *mutica* group (Casey's group VIII) contains one species, *D. mutica*, which resembles the *lurida* group but differs in having the elytral apices entire and slightly produced at the suture, and the prosternal process, instead of being concave, is convex in the male, or flat in the female. The seventh or *horni* group (Casey's group IV) includes three far western species: *D. horni*, *D. cajonensis*, and *D. querci*. These are robust, have the antenna with segment two distinctly shorter than segment three, and the body hair generally long and conspicuous.

The species of the *tenebrosa* group have the characteristics of European species for which Gistel (1834) erected the genus *Argante* but these characteristics are not treated here as of generic importance.

I have numbered the species for easier reference among checklist, key, and descriptions.

Checklist of *Dicerca* species and subspecies

The *tenebrosa* group:

1. *D. tenebrosa* (Kirby)
 - 1a. *D. tenebrosa tenebrosa* (Kirby)
 - 1b. *D. tenebrosa knulli* Nelson
2. *D. crassicollis* LeConte
3. *D. sexualis* Crotch
4. *D. lugubris* LeConte
5. *D. punctulata* (Schönheer)
6. *D. dumolini* (Laporte and Gory)
7. *D. tuberculata* (Laporte and Gory)

The *pectorosa* group:

8. *D. pectorosa* LeConte

The *tenebrica* group:

9. *D. callosa* Casey
- 9a. *D. callosa callosa* Casey
- 9b. *D. callosa frosti* Nelson
10. *D. tenebrica* (Kirby)
11. *D. hesperoborealis* Hatch and Beer
12. *D. divaricata* (Say)
13. *D. caudata* LeConte

The *aeneovaria* group:

14. *D. aeneovaria* Waterhouse
15. *D. inconspicua* Waterhouse
16. *D. propinqua* Waterhouse

The *lurida* group:

17. *D. pugionata* (Germar)
18. *D. lepida* LeConte
19. *D. asperata* (Laporte and Gory)
20. *D. spreta* (Gory)
21. *D. juncea* Knull
22. *D. obscura* (Fabricius)
23. *D. lurida* (Fabricius)

The *mutica* group:

24. *D. mutica* LeConte

The *horni* group:

25. *D. horni* Crotch
- 25a. *D. horni horni* Crotch
- 25b. *D. horni nelsoni* Beer
26. *D. cajonensis* Knull
27. *D. querci* Knull

Key to the Species of Dicerca

1	Tip of elytron entire, truncate, weakly bidentate, or produced at suture (Figs. 24, 64, 77)	2
1'	Tip of elytron strongly bidentate (Fig. 23)	21

2 (1)	Prosternal process slightly convex (male) or flattened (female), upper surface with raised areas inconspicuous (<i>mutica</i> group)	
		(24) mutica LeConte
2'	Prosternal process slightly to strongly concave, or if flattened, upper surface with raised areas conspicuous	3
3 (2')	Second segment of antenna distinctly shorter than third (Fig. 36), elytra generally not to moderately produced	4
3'	Second segment of antenna as long as or barely shorter than third (Fig. 37), elytra generally strongly produced (<i>tenebrica</i> group)	16
4 (3)	Elytral hair long, especially at sides, smooth raised areas of elytra small & inconspicuous, hosts: angiosperms (<i>horni</i> group)	5
4'	Elytral hair short, smooth raised areas of elytra generally prominent, hosts: gymnosperms (except <i>pectorosa</i> LeConte)	8
5 (4)	Elytral striae well defined especially toward suture, mesotibia of male with acute tooth (Fig. 32)	(25) horni Crotch
5'	Elytral striae poorly defined, mesotibia of male with blunt tooth (Fig. 29), male of <i>cajonensis</i> unknown	6
6 (5)	Color cupreo-aeneous to virido-aeneous above; mesotibial tooth of male longer & more acute	(25a) horni horni Crotch
6'	Color brightly cupreous above; mesotibial tooth of male tending to be shorter & more blunt (California, Inyo County)	
		(25b) horni nelsoni Beer
7 (5')	Pronotum with side margins subparallel at base then strongly rounded to anterior margin	(26) cajonensis Knull
7'	Pronotum with side margins angulate before middle	
		(27) querci Knull
8 (4')	Last ventral abdominal segment truncate, with two longitudinal smooth raised areas and a shorter median one at base, hosts: <i>Prunus</i> spp. (<i>pectorosa</i> group)	(8) pectorosa LeConte
8'	Last ventral abdominal segment emarginate, tridentate, or entire, with smooth raised areas not as above, hosts: gymnosperms (<i>tenebrosa</i> group)	9
9 (8')	Mesotibia of male toothed (Fig. 31), last ventral abdominal segment of female tridentate (Fig. 19), head with irregular raised area on vertex between eyes (coniferous regions, Pacific States to Atlantic States)	(1) tenebrosa (Kirby) 10

9' Mesotibia of male simple (Fig. 28), last ventral abdominal segment of female entire (Fig. 22), except in *crassicollis* LeConte, which has transverse ridge between eyes 11

10 (9) Apex of elytron entire with angles usually not produced; usually less brightly cupreous with black raised areas usually less extensive (western, northern and northeast North America) (1a) *tenebrosa tenebrosa* (Kirby)

10' Apex of elytron obliquely truncate with angles variously produced; usually more brightly cupreous with black raised areas usually more extensive (southeastern United States from Maryland and West Virginia to Florida) (1b) *tenebrosa knulli* Nelson, new Subspecies

11 (9') Far western species 12

11' Eastern species 13

12 (11) Elytra with basal and succeeding smooth raised areas of third interval separated by punctate area (Fig. 65), last ventral abdominal segment of female tridentate, male genitalia with side margins expanded (Fig. 43) (2) *crassicollis* LeConte

12' Elytra with basal and succeeding smooth raised areas of third interval connected by slender raised ridge (Fig. 66), last ventral abdominal segment of female entire, male genitalia with side margins more parallel (Fig. 44) (3) *sexualis* Crotch

13 (11') Smooth areas of elytra inconspicuous, dark brown or black or with a cupreous tinge above 14

13' Smooth areas of elytra conspicuous, brassy-brown, cupreous or green above 15

14 (13) Pronotal side margin strongly expanded, elytral tips moderately produced (Great Lakes Region and Quebec to Northwest Territories) (4) *lugubris* LeConte

14' Pronotal side margin not or weakly expanded, elytral tips weakly produced (Eastern United States north to Ontario) (5) *punctulata* (Schönheer)

15 (13') Brassy-brown, smooth areas of pronotum and elytra strongly raised, pronotal side margin abruptly expanded (6) *dumolini* (Laporte and Gory)

15' Iridescent green or cupreous, smooth areas of pronotum and elytra moderately raised, pronotal side margin gradually expanded (7) *tuberculata* (Laporte and Gory)

16 (3') Median channel of pronotum well-developed, punctures of upper surface generally coarse laterally and more rugose 17

16' Median channel of pronotum faintly indicated, punctures of upper surface moderate laterally and less rugose 20

17 (16) Mesotibia of male simple or with a slight dilation (Fig. 27) (9) **callosa** Casey 18

17' Mesotibia of male with well-developed tooth (Fig. 30) 19

18 (17) Seventh antennal segment as broad as long (Fig. 37), pronotal width to length an average ratio of 1.6 to 1 (9a) **callosa callosa** Casey

18' Seventh antennal segment distinctly longer than broad (Fig. 38), pronotal width to length an average ratio of 1.75 to 1 (9b) **callosa frosti** Nelson

19 (17') Median carina of antecoxal piece without or with but finely indicated groove (Fig. 33), parameres of male genitalia expanded distally, apex of penis without narrow prolongation (Fig. 51), hosts: various species of *Populus* (Canada and U. S., except southern and southeastern states) (10) **tenebrica** (Kirby)

19' Median carina of antecoxal piece with prominent groove (Fig. 34), parameres of male genitalia more parallel distally, apex of penis with narrow prolongation (Fig. 52), hosts: birch and alder (B. C. and far western states) (11) **hesperoborealis** Hatch and Beer

20 (16') Pronotum widest at middle, elytral striae finely but usually distinctly indicated, parameres of male genitalia rather abruptly tapering to apex (Fig. 53) (12) **divaricata** (Say)

20' Pronotum widest at base and feebly rounded to apex (sometimes sub-parallel toward base), elytral striae faintly indicated, parameres of male genitalia tapering more gradually to apex (Fig. 54) (13) **caudata** LeConte

21 (1') Front margin of prosternum with distinct tooth on either side of middle; Mexico (*aeneovaria* group) 22

21' Front margin of prosternum truncate or indistinctly lobed on either side of middle (*lurida* group) 24

22 (21) Elytra with small but conspicuous pubescent areas; mesotibia of male simple 23

22' Elytra without conspicuous pubescent areas; mesotibia of male distinctly lobed (14) **aeneovaria** Waterhouse

23 (22) Robust; pubescent areas of elytra small, irregular, consisting of two or three small transversely arranged patches of hairs, one on lateral margin near basal fourth, another toward side at middle and the third, when present, toward side near apical fourth; hind angles of last abdominal sternite of male acutely produced (15) *inconspicua* Waterhouse

23' Slender; pubescent areas of elytra larger and more regular, consisting of a smaller spot on lateral margin near basal fourth and a larger transverse spot near side at middle; hind angles of last abdominal sternite of male weakly produced (16) *propinqua* Waterhouse

22 (19') Elytral tips distinctly prolonged (Fig. 78) (17) *pugionata* (Germar)

22' Elytral tips not or but faintly prolonged (Figs. 79—81) 23

23 (22') Raised smooth areas of pronotum and elytra distinctly indicated 24

23' Raised smooth areas feebly indicated 26

24 (23) Transverse smooth callous between eyes feebly indicated, front of head flat, body narrow, brassy cupreous, punctate areas moderate and quite uniform (18) *levida* LeConte

24' Transverse smooth callous between eyes strongly indicated, body moderately robust, punctate areas coarse and rugose 25

25 (24') Front of head flat, mesotibia of male simple, color aeneous usually with greenish tinge (19) *asperata* (Laporte and Gory)

25' Front of head concave, mesotibia of male toothed, color aeneocupreous (20) *spreta* (Gory)

26 (23') Hind coxal plate notched with tooth on outer side of notch (Fig. 25), pronotal margins narrowed from base 27

26' Hind coxal plate indistinctly notched without tooth (Fig. 26), pronotal margins subparallel to beyond middle, then converging to apex (23) *lurida* (Fabricius)

27 (26) Narrow, elongate, strongly convex, pronotum with sides almost straight and converging anteriorly, with median punctate channel distinct from base to apex (21) *juncea* Knull

27' Elongate oval, moderately convex, pronotum with sides feebly arcuate, with median punctate channel interrupted (22) *obscura* (Fabricius)

1. *Dicerca tenebrosa* (Kirby) (Figs. 1, 19, 24, 31, 36, 42, 64)

Buprestis tenebrosa Kirby, 1837, Fauna Bor. Amer., 4: 155.

D i a g n o s i s : Moderately robust, black to cupreous above and below, more shining below; upper surface with prominent, irregular, smooth, black raised areas; elytral apices slightly to moderately produced, entire or obliquely truncate (Figs. 24, 64); mesotibia of male with tooth (Fig. 31); last visible abdominal sternite of female tridentate (Fig. 19).

T y p e l o c a l i t y : North America, 65° latitude, type (BMNH).

G e o g r a p h i c a l d i s t r i b u t i o n (fig. 1): Alaska, Canada (except Newfoundland), the pine belt along the atlantic seaboard, and the rest of the United States except the middle, and southern states including Texas and Oklahoma.

H o s t s : Breeds in pines and true firs (Chamberlin, 1917), also Douglas fir and Englemann spruce (Keen, 1952).

C o m p a r i s o n s : From others in this group *D. tenebrosa* differs by the males having the mesotibia with an internal tooth (Fig. 31), and the females having the last visible abdominal sternite tridentate (*D. crassicollis* also). From *D. crassicollis* and *D. sexualis*, with which it is often confused, *D. tenebrosa* differs also in the less strongly expanded lateral margins of the pronotum and the generally less extensive dorsal punctate areas.

Two subspecies can be recognized.

1a. *Dicerca tenebrosa tenebrosa* (Kirby) (Figs. 1, 19, 31, 36, 42, 64)

Buprestis tenebrosa Kirby, 1837, Fauna Bor. Amer., 4: 155; White 1848: 19; Bethune, 1872, Can. Ent., 4: 31.

Buprestis distinguenda Laporte & Gory 1837: 100, Pl. 26, Fig. 137.

Buprestis chrysea Melsheimer 1845: 143.

Stenuris tenebrosa Melsheimer 1853: 63.

Stenuris chrysea Melsheimer 1853: 62.

Dicerca tenebrosa LeConte, 1850, Remarks Coleopt. L. Superior, Bupr., p. 227; Lacordaire 1857: 36; LeConte 1860 (1859): 199; Pettit 1870: 102; E. Saunders 1871: 37; Crotch 1873: 86; Provancher 1877: 348; Hubbard & Schwarz 1878: 636; Harrington, 1881, Trans. Ottawa Field Nat. Club No. 2, p. 30; LeConte, 1882, Geol. & Nat. Hist. Surv. Can., Rep. (1880—1882), lists 2 & 6; W. Saunders, 1884, 14. Rep. Ent. Soc. Ont., p. 54; Harrington, 1885, 15. Rep. Ent. Soc.

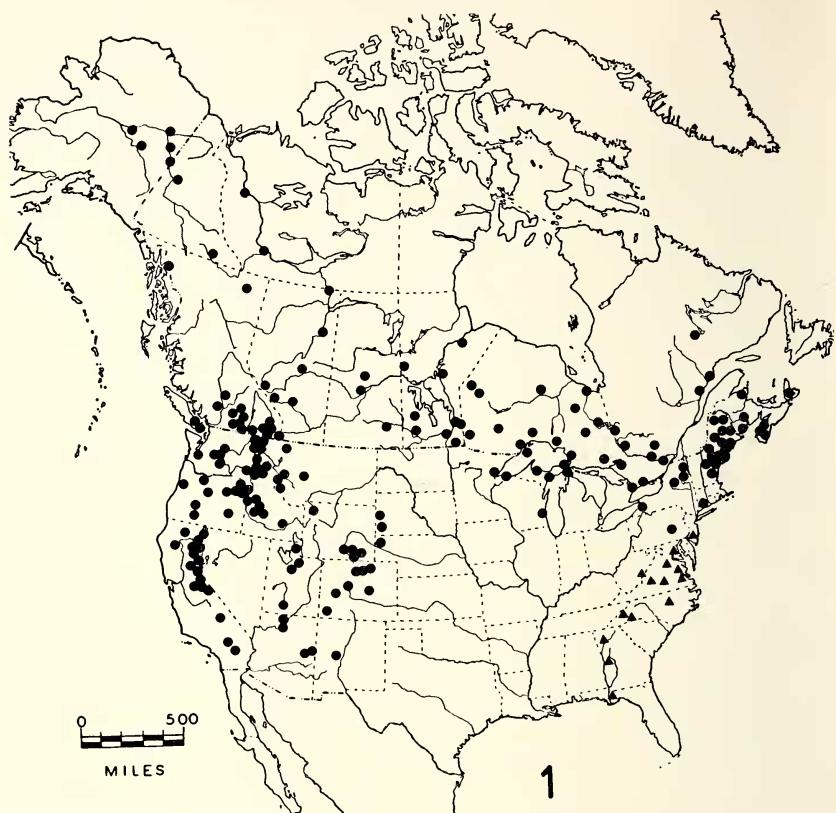


Fig. 1. Known geographic ranges of *Dicerca tenebrosa tenebrosa* (Kirby) (circles) and *D. tenebrosa knulli* Nelson (triangles).

Ont., p. 30; Brodie, 1888, Proc. Can. Inst. Toronto, 3 (5): 214; Holland, 1888, Can. Ent., 20: 91; F. Blanchard 1889: 30; Harrington 1890: 159; Packard 1890: 684; Kerremans 1892: 89; Evans 1895: 146; Daggett, 1895, Ent. News, 6: 314; Bowditch, 1896, Psyche, 7, Suppl. 2, p. 6; Holland, 1900, Ent. News, 9: 422; McGillivray & Houghton, 1902, Ent. News, 13: 251; Kerremans 1903: 132; Felt 1906: 648, 657; Harvey, 1906, Bull. B. C. Ent. Soc., No. 4; Casey 1909: 155; Gibson, 1911, Ent. Rec. Can., p. 12; 1912, 42. Rep. Ent. Soc. Ont., p. 100; Sorauer-Reh, 1913, Handb. Pflanzenkrankh., 3: 485; Gibson, 1915, 45. Rep. Ent. Soc. Ont., p. 137; Chagnon 1917: 217; Chamberlin 1917 a: 130; 1917 b, Rev. Appl. Ent. A, 5: 258 (abstract); Morris, 1919, Can. Ent., 51: 50; Britton 1920: 244; Leng 1920: 180; Knull 1922: 80; Chamberlin 1924 a: 185; Mundinger, 1924, N. Y. St. Coll. Forest, Tech. Pub. 17, 4: 315; Knull 1925: 14, 15, Pl. 1, Fig. 16, Pl. 4, Fig. 1; Chamberlin 1926: 197, 198; Essig 1926: 397; Fall 1926: 193; Leonard 1928: 357; Chamberlin 1929: 114; Stace Smith 1929: 71;

Obenberger 1930: 338, 339; Leng & Mutchler 1933: 29; Van Dyke 1934: 91; Hatch 1938: 185; Beer & Hatch 1941: 105; Knowlton & Wood 1948: 43 (*fenebrosa*, misspelling); Craighead 1950: 195; Keen 1952: 190; Barr 1971: 59, Pl. 6, Fig. 4.

Dicerca chrysea Lacordaire 1857: 36; LeConte 1860 (1859): 200; Pettit 1870: 102; E. Saunders 1871: 37; Crotch 1873: 86; Blanchard 1889: 30; Kerremans 1892: 86; Hamilton, 1893, Can. Ent., 25: 274; Evans 1895: 146; Frost, 1915, Can. Ent., 47: 142; Gibson, 1917, 47. Rep. Ent. Soc. Ont., p. 149; Leng 1920: 180; Chamberlin 1926: 182; Frost 1928: 134; Leonard 1928: 357; Obenberger 1930: 326.

Dicerca bifoveata LeConte 1860 (1859): 202; E. Saunders 1871: 37; Kerremans 1903: 132; Casey 1909: 159.

Dicerca distinguenda E. Saunders 1871: 37; LeConte 1873: 331; Kerremans 1903: 132; Casey 1909: 155; Chamberlin 1926: 182; Leonard 1928: 357; Obenberger 1930: 327.

Dicerca acerba Casey 1909: 158; Leng 1920: 180 (= *chrysea*); Obenberger 1930: 325. **New synonymy.**

Dicerca mystica Casey 1909: 159 (subsp. of *chrysea*); Leng 1920: 180 (= *chrysea*); Chamberlin 1926: 198 (= *tenebrosa*); Obenberger 1930: 326 (var. of *bifoveata*).

Dicerca montana Casey 1909: 160; Leng 1920: 180 (= *chrysea*); Chamberlin 1926: 198 (= *tenebrosa*); Obenberger 1930: 332.

Dicerca wickhami Casey 1909: 160; Leng 1920: 180 (= *chrysea*); Chamberlin 1926: 182 (= *chrysea*); Obenberger 1930: 340. **New synonymy.**

Dicerca stolida Casey 1909: 161; Leng 1920: 180 (= *chrysea*); Chamberlin 1926: 198 (*stelida*, misspelling = *tenebrosa*); Obenberger 1930: 338.

Male: Black above with cupreous tints, dark cupreous below. Head flattened; coarsely, rugosely punctured with irregular, smooth, raised areas on front and two longitudinal smooth areas on vertex, punctured areas sparsely clothed with semirecumbent white hair; antennae reaching middle of pronotum at sides, third segment distinctly longer than second (Fig. 36).

Pronotum with lateral margins parallel at base, expanded to just before middle then converging to narrowest part at anterior angles; disk coarsely, rugosely punctured; median channel distinct, with small, irregular, smooth area at middle and a longitudinal, smooth, raised area, on either side of channel, extending from base to apex; a longitudinal smooth raised area, midway to lateral margin, interrupted by oblique depression; irregular, smooth, raised areas extending forward from basal angles; short recumbent white hair inconspicuous or absent.

Elytra wider at base than pronotum, lateral margins subparallel and slightly sinuate to widest part just behind middle, then converging to slightly

produced apices, apices entire; disk densely punctured, striae punctures larger; surface with numerous irregular, smooth, black, raised areas becoming carinate toward apices.

Venter with prosternum densely, rugosely punctured, transverse depression near anterior margin; prosternal process broadly concave, concavity extending to anterior part of first abdominal sternite; concavity densely punctured and clothed with dense suberect white hair that extends to under surface of mesofemur; smooth areas border concavity of thoracic sternites; mesotibia with strong tooth (Fig. 31); abdominal sternites rugosely punctured, punctures less dense medially and clothed with depressed white hair; apex of last visible sternite emarginate.

Male genitalia (Fig. 42) moderately robust, penis with slender prolongation at apex.

Length 16.5 mm; width 6.2 mm.

Redescribed from a male specimen in the author's collection from Idaho, near Coeur d'Alene, that compares well with a cotype (BMNH).

Female: Differs from male by having ventral concavity less pronounced, punctures and hair less dense; mesofemur without dense hair beneath; mesotibia without tooth; apex of last visible abdominal sternite tridentate (Fig. 19).

Variation: This widespread subspecies varies considerably in color from dull black to cupreous or with a greenish tint. The ratio of punctate areas to smooth relief areas vary considerably. The smooth black raised areas are occasionally strongly elevated. The lateral margins of the pronotum vary in the degree of expansion and the elytral apices are somewhat variable. One female from Monmouth, Maine, in the CAS, has the elytral apices obliquely truncate similar to *D. tenebrosa knulli*. The male genitalia in some from Ontario are more narrow than in the typical form. The males vary from 11.7 to 20.0 mm long and from 4.5 to 7.2 mm wide; the females from 10.5 to 22.0 mm long and from 4.1 to 8.1 mm wide.

Type locality: Of *tenebrosa*, North America, 65° latitude, type (BMNH); of *distinguenda*, stated in error as Brazil interior (actually confined to North America), type (MHNP); of *chrysea*, Pennsylvania, type should be at the MCZ but could not be located; of *bifoveata*, Lake Superior, (MCZ, No. 2657); of *montana*, Montana; of *acerba*, Ontario, Sudbury; of *mystica*, Michigan; of *wickhami*, Wisconsin, Bayfield; of *stolida*, Colorado; the types of the latter five species (Casey collection, USNM).

Geographical Distribution (Fig. 1): From 1532 speci-

mens examined. Canada: Throughout except Newfoundland. United States: Alaska, Arizona, California, Colorado, Connecticut, Idaho, Maine, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Mexico, New York, Oregon, Pennsylvania, South Dakota, Utah, Washington, Wisconsin, and Wyoming.

Host: Material has been examined as collected on: *Abies concolor* Lindley and Gordon, *A. balsamea* (L.) Miller, *Picea glauca albertiana* Sargent, *P. glauca* (Möench) Voss, *Pseudotsuga taxifolia* (LaMarck) Britton, *Pinus ponderosa* Lawson, *P. contorta* Loudon, *P. flexilis* James, *P. banksiana* Lamb., *P. scopulorum* Engelmann, and *P. resinosa* Aiton.

Flight period: Collected from April to November.

1b. *Dicerca tenebrosa knulli* Nelson, new subspecies (Fig. 1, 24)

Dicerca tenebrosa Franklin and Lund 1956: 25.

Female holotype: Differs from *D. t. tenebrosa* as follows: small, strongly convex; cupreous above, more brightly below; elytra weakly produced, apices emarginate with lateral and sutural angles slightly produced (Fig. 24).

Length 12.5 mm; width 4.7 mm.

Male allotype: Similar to female in general appearance but differs in having ventral midline concavity more pronounced, punctures and hair more dense; mesofemur with dense brush beneath; mesotibia with tooth; and apex of last visible abdominal sternite emarginate.

Length 13.0 mm; width 5.0 mm.

Type material: Holotype, ♀ (USNM, No. 72511) from Virginia, New Kent County, 10-IV-40, L. A. Hetrick. Allotype, ♂ (G. H. Nelson collection) from Virginia, Nottoway County, Camp Pickett, 4-V-52, B. J. Adelson. Paratypes: Virginia: 4 ♂, same data as allotype; 2 ♂, 1 ♀, same place, 20-IV-52; 1 ♀, same place, 13-IV-52, all by B. J. Adelson; 5 ♂, 7 ♀ Fredericksburg; 2 ♂, 1 ♀, same place, 30-IV-02; 1 ♂, same place, I-VI-02; 1 ♂, Nelson County, 17-VIII-27, W. Robinson; Maryland: 1 ♀, College Park, 23-VI-48, H. F. Howden; 1 ♀, Bladensburg, 4-V-19, L. L. Buchanan; 1 ♀, Plum Point, 21-IV-57, D. G. Kissinger; West Virginia, White Sulphur Springs: 1 ♀, 16-VI-11; 1 ♀, 21-VI-14; 1 ♀, 24-VI-10; 1 ♀, 22-VII-10; 1 ♂, 25-VIII-12, all by W. Robinson; North Carolina: 2 ♂, Raleigh, 14-IV-49; 1 ♂, Raleigh, 5-IV-49; 1 ♂, Raleigh, 3-V-53, all by H. F. Howden; 2 ♂, Ra-

leigh, 8-IV-53; 1 ♀, Raleigh, 1-IV-53; 1 ♀, Raleigh, 23-IV-52; 1 ♂, Raleigh, 24-IV-53, all by B. K. Dozier; 1 ♀, Tryon, 2-IV-03, Fiske; 1 ♀, Asheville, 6-VI-24, A. H. MacAndrews; Georgia: 1 ♀, Prattsburg, 27-IV-38, P. W. Fattig; 1 ♀, Dallas, 18-IV-37, P. W. Fattig; 1 ♂, Florida, Liberty County, F. N. Young. Paratypes are deposited in the following collections: CAS, Florida State Plant Board, USNM, University of California at Berkeley, W. F. Barr, H. F. Howden, J. N. Knull, and G. H. Nelson.

V a r i a t i o n : Specimens from West Virginia tend to be much darker in color. The angles of the elytral apices vary some in their prominence with one from Asheville, North Carolina (USNM) having the angles rounded — not included in type series. The males vary from 11.5 to 15.5 mm long and from 4.7 to 6.0 mm wide; the females from 12.0 to 18.5 mm long and from 4.7 to 7.2 mm wide. A nearly aypical female from New Jersey is not included in the type series.

H o s t : Collected in North Carolina from *Pinus echinata* Miller.

This subspecies is gratefully named in honor of Professor J. N. Knull who has aided me in many ways in this study.

2. *Dicerca crassicollis* LeConte (Figs. 2, 43, 65)

Dicerca crassicollis LeConte, 1857b, Rep. Pac. Explor. 47 Parallel, Ins., 12: 45; 1860 (1859): 202; E. Saunders 1871: 37; Crotch 1873: 86; Kerremans 1903: 132; Casey 1909: 155; Leng 1920: 180; Chamberlin 1926: 182, 197 (*crossicollis*, misspelling); Essig 1926: 396; Obenberger 1930: 327; Keen 1952: 190; Barr 1971: 59.

Dicerca californica Crotch 1873: 87; Kerremans 1892: 86; Fall, 1901, Occas. Papers Cal. Acad. Sci., 7: 115; Van Dyke, 1902. Jour. N. Y. Ent. Soc., 10: 172; Kerremans 1903: 132; Casey 1909: 162; Woodworth 1913: 196; Van Dyke 1934: 91.

Dicerca hesperica Casey 1909: 155 (subsp. of *crassicollis*; 1914, Mem. Coleopt., 5: 155).

Dicerca tenebrosa Kerremans 1892: 89 (part); Chamberlin 1926: 195, 196 (part).

Dicerca sexualis Chamberlin 1917a: 130 (part); 1924a: 185 (part); 1929: 114 (part); Van Dyke 1934: 91 (part); Hatch 1938: 185 (part); Beer & Hatch 1941: 105 (part).

D i a g n o s i s : Robust and moderately convex; dark cupreous brown above with black elevations, beneath shining cupreous with purple cast; elytral apices truncate or emarginate, not or but feebly produced; mesotibia of male simple; last abdominal sternite of female tridentate.

Male: Head flattened; coarsely, rugosely punctured with transverse raised area between eyes and less definite longitudinal raised areas on vertex, punctured areas sparsely clothed with short semirecumbent white hair; antennae as in *D. tenebrosa*.

Pronotum with lateral margins parallel at base, abruptly expanded to just before middle, then converging to narrowest part at anterior angles; disk densely, rugosely punctured; median channel and smooth raised areas in *D. tenebrosa* but more distinct; sparse recumbent white hair inconspicuous.

Elytra shaped as in *D. tenebrosa* but tapering more abruptly to abbreviated apices which are slightly emarginate; disk densely punctured; interstitial spaces with moderately raised, longitudinal, smooth black areas, basal and succeeding raised areas of third interspace not connected.

Venter similar to *D. tenebrosa* except median concavity narrower, hair not so coarse or extensive, mesofemur without dense hair beneath; mesotibia simple; abdominal sternites similar to *D. tenebrosa*; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 43) moderately robust, penis acute, without prolongation.

Length: 15.7 mm; width 6.0 mm.

Redescribed from a male homotype in the author's collection from Washington, the Cascade Mountains, west of Yakima.

Female: Differs from male by having ventral concavity but faintly indicated, hair short and sparse; apex of last abdominal sternite tridentate.

Variation: In color *D. crassicollis* varies from cupreous-brown to almost black. The elytral apices are sometimes merely truncate with the sutural angle slightly produced, and the elevated areas are occasionally fairly strongly indicated. The males vary from 13.2 to 17.7 mm long and from 5.1 to 6.8 mm wide; the females from 13.5 to 20.5 mm long and from 5.1 to 8.0 mm wide.

Type locality: Of *crassicollis*, Washington, Steilacoom (MCZ, No. 2658); of *californica*, California (MCZ, No. 5075); of *hesperica*, Washington State, (Casey collection, USNM).

Geographical distribution (Fig. 2): From 183 specimens examined. Pacific coast states from southern California to British Columbia and Idaho.

Host: From material examined *D. crassicollis* has been collected on the following: *Pseudotsuga taxifolia* (LaMarch) Britton, *Pinus ponderosa*

Lawson, and *Abies magnifica* A. Murray. Keen (1952) records the host as Douglas fir.

Flight period: Collected from March to October.

Comparisons: *D. crassicollis* is most often confused with *D. sexualis* but can be separated as indicated in the key and by usually being slightly more robust.

3. *Dicerca sexualis* Crotch (Figs. 3, 22, 28, 44, 66)

Dicerca sexualis Crotch 1873: 87; LeConte, 1878, Proc. Amer. Phil. Soc., 17: 472; Kerremans 1892: 89; Cockerell, 1898, N. Mex. Exp. Sta. Bull. 28, p. 152; Kerremans 1903: 131; Harvey, 1906 a, Bull. B. C. Ent. Soc., 4; Fletcher, 1906, 36. Rep. Ent. Soc. Ont., p. 100; Fall and Cockerell, 1907, Trans. Amer. Ent. Soc., 33: 179; Casey 1909: 162; Woodworth 1913: 196; Gibson, 1913, 43. Rep. Ent. Soc. Ont., p. 126; 1914, 44. Rep. Ent. Soc. Ont., p. 116; Chamberlin 1917 a: 130 (*sexulalis*, misspelling) (part); Leng 1920: 180; Chamberlin 1924 a: 185 (part); 1926: 195; Essig 1926: 397; Hardy, 1927 a, Rep. Prov. Mus. Nat. Hist., c33; Chamberlin 1929: 114 (part); Obenberger 1930: 337; Van Dyke 1934: 91 (part); Hatch 1938: 185 (part); Blackwelder 1939: 43; Beer & Hatch 1941: 105 (part); Hardy, 1942, Proc. Ent. Soc. B. C., 39: 11; Kimmey and Furniss, 1943, U. S. Dep. Agr., Tech. Bull. 851, p. 23; Chamberlin, 1949, Ins. For. Prod. etc., p. 50; Keen 1952: 190; Barr 1971: 59.

Diagnosis: Moderately robust and convex; dark cupreous above and below, more shining and with a purple cast below and on legs; upper surface with prominent, elongate, smooth, black, raised areas; elytral apices truncate or slightly emarginate, only slightly produced; mesotibia of male simple (Fig. 28); last abdominal sternite of female entire (Fig. 22).

Male: Head flattened; coarsely, rugosely punctured with two longitudinal raised areas on vertex and transverse raised area between eyes, punctured areas sparsely clothed with semirecumbent white hair; antennae as in *D. tenebrosa*.

Pronotum with lateral margins parallel at base, abruptly expanded to just anterior of middle, then converging to narrowest part at anterior angles; disk coarsely, rugosely punctured; median channel and smooth raised areas as in *D. tenebrosa* but more distinct; sparse recumbent white hair inconspicuous.

Elytra shaped as in *D. tenebrosa* but tapering more abruptly to slightly emarginate apices which are less prolonged; disk densely punctured, strial punctures larger; interstrial spaces with strongly raised, longitudinal, smooth, black areas; basal and succeeding raised areas of third interspace connected by raised ridge.

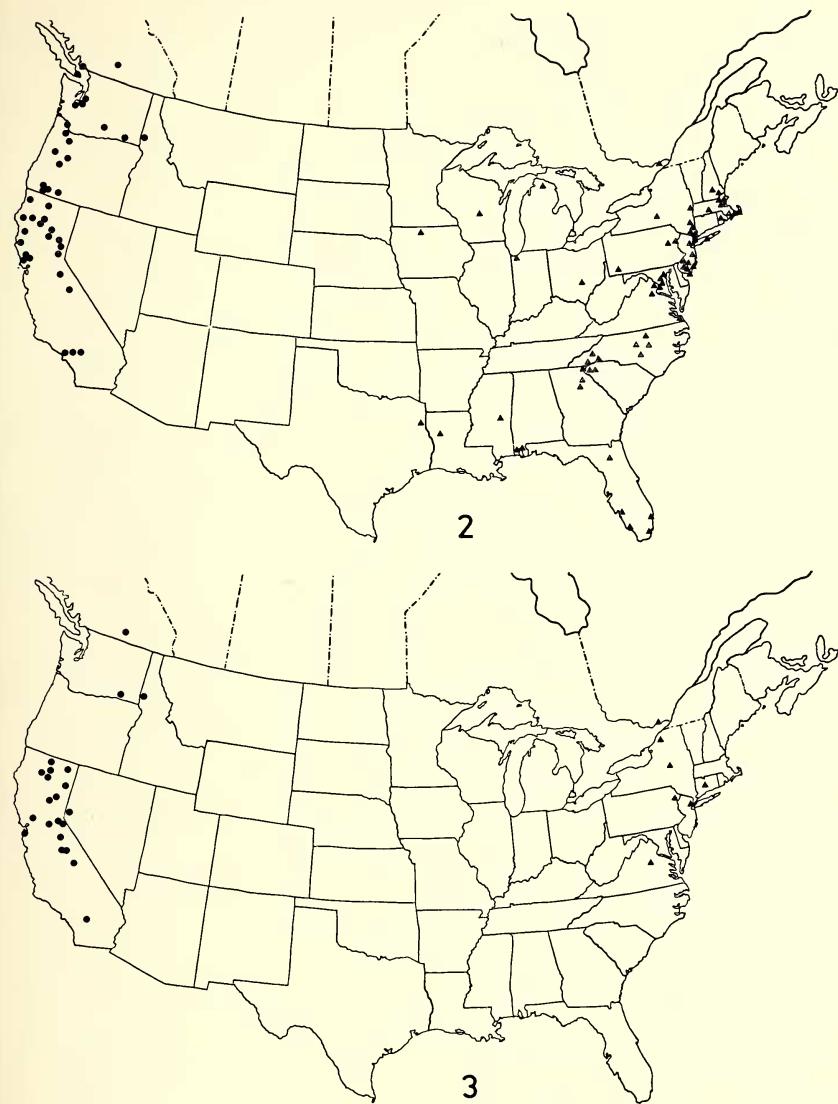


Fig. 2—3: Known geographic ranges of Fig. 2, *Dicerca crassicollis* LeConte (circles) and *D. punctulata* (Schönheer) (triangles); Fig. 3, *D. sexualis* Crotch (circles) and *D. dumolini* (Laporte & Gory) (triangles).

Venter similar to *D. tenebrosa* except median concavity not as broad, hair not so coarse or extensive, mesofemur without dense hair beneath; mesotibia simple (Fig. 28); abdominal sternites similar to *D. tenebrosa*; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 44) relatively slender, penis acute, without prolongation.

Length 15.7 mm; width 6.0 mm.

Redescribed from a male homotype from California, Lassen County, Facht, in the author's collection.

F e m a l e : Differs from male by having ventral concavity but faintly indicated, hair short and sparse; apex of last abdominal sternite acutely entire.

V a r i a t i o n : This species appears to be fairly uniform in appearance but varies in color from cupreous to almost black and the elytral apices may be simply truncate. The males vary from 14.0 to 17.5 mm long and from 5.1 to 6.5 mm wide; the females from 12.3 to 20.0 mm long and from 4.6 to 7.2 mm wide.

T y p e l o c a l i t y : There are three specimens under *sexualis* in the LeConte collection (MCZ). The type, No. 5076 with a blue disk, meaning "Oregon", is the second of the three. Specimens one and three are *D. crassicollis*.

G e o g r a p h i c a l d i s t r i b u t i o n : (Fig. 3): From 76 specimens examined. Pacific coast states from southern California to British Columbia, Idaho, and Nevada. Chamberlin (1926) lists New Mexico but that record may be from misidentified material.

H o s t : From material examined *D. sexualis* has been taken on *Pinus ponderosa* Lawson. Chamberlin (1917) records it emerging from Douglas fir, *Pseudotsuga taxifolia* (LaMarck) Britton, and on knobcone pine, *Pinus attenuata* Lemmon. Keen (1952) also records Jeffrey pine, *Pinus jeffreyi* Greville & Balfour, as a host.

F l i g h t p e r i o d : Collected from March to October.

C o m p a r i s o n s : See under *D. crassicollis*.

4. *Dicerca lugubris* LeConte (Figs. 4, 45, 69)

Dicerca lugubris LeConte 1860 (1859): 200; Crotch 1873: 86; Hubbard & Schwarz 1878: 636; Harrington, 1887, 17. Rep. Ent. Soc. Ont., p. 31; Kerremans 1892: 87; Evans 1895: 146; Kerremans 1903: 132; Casey 1909: 156, 157; Nicolay, 1921, Jour. N. Y. Ent. Soc., 29: 174; Chamberlin 1926: 187; Fall 1926: 193; Leng & Mutchler, 1927, Cat. Coleopt. Amer. N. of Mex. (Suppl.), p. 30; Obenberger 1930: 330, 331; Leng & Mutchler 1933: 29.

Dicerca lacustris LeConte 1860 (1859): 202; Crotch 1873: 86.

Dicerca tenebrosa Kerremans 1892: 89 (part).

Dicerca morio Casey 1909: 156; Chamberlin 1926: 197 (*mario*, misspelling) (= *tenebrosa*); Obenberger 1930: 332. *New synonymy.*

Dicerca austera Casey 1909: 157.

Diagnosis: Moderately convex; dark cupreous to black above, cupreous below; upper surface with inconspicuous raised areas; elytral apices entire, moderately to strongly produced; mesotibia of male simple; last abdominal sternite of female entire.

Male: Head flattened; coarsely, rugosely punctured with two irregular, longitudinal raised areas on vertex and a transverse raised area between eyes, punctured areas with inconspicuous, semirecumbent white hair; antennae as in *D. tenebrosa*.

Pronotum with lateral margins parallel at base, rather strongly expanded to in front of middle, then converging to narrowest at anterior angles; disk densely, confluent punctured, strongly sculptured, with four longitudinal, smooth, black, raised areas, the lateral pair interrupted by oblique depression behind middle, median channel broad, more impressed anteriorly and posteriorly; short white hair inconspicuous.

Elytra wider at base than pronotum, lateral margins slightly sinuate, parallel or slightly expanded to behind middle, then converging to distinctly produced apices, apices entire; disk finely, densely punctured, strial punctures larger; intervals with numerous smooth black areas.

Venter with sternites coarsely, densely, punctured, meso- and metasterna less so medially; prosternal process slightly concave without smooth raised margins, concavity extending to anterior part of first abdominal sternite and moderately clothed with short, semirecumbent white hair; mesotibia simple; abdominal sternites confluent punctured laterally, punctures smaller and less dense medially; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 45) slender with sides subparallel.

Length 14.5 mm; width 5.2 mm.

Redescribed from a male homotype in the author's collection from Quebec, Laniel.

Female: Differs from male in having the ventral median concavity less pronounced and apex of last abdominal sternite entire.

Variation: Rather uniform in appearance but the color varies from brassy-cupreous to black above and the punctured areas may have

white pruinescence in fresh specimens. The males vary from 11.1 to 16.5 mm long and from 4.1 to 6.0 mm wide; the females from 11.1 to 18.0 mm long and from 3.9 to 6.4 mm wide.

Type locality: Of *lugubris*, Michigan, Lake Superior, Marquette, type (MCZ, No. 2661); of *lacustris*, Michigan, Lake Superior, Point Keweenaw, type (MCZ, No. 2662); of *morio*, Michigan, Lake Superior, Whitefish Point; of *austera*, Michigan, Lake Superior, Whitefish Point, types of the last two species (Casey collection, USNM).

Geographical distribution (Fig. 4): From 99 specimens examined. Canada: Manitoba, Northwest Territories, Ontario, Quebec, and Saskatchewan. United States: Iowa, Michigan, Minnesota, and Wisconsin. Chamberlin (1926) records Louisiana which may be due to a misidentified specimen.

Host: Unknown but it has been taken on Jack Pine, *Pinus banksiana* Lambert in Minnesota and Saskatchewan. Chamberlin (1926) lists maple as the host but this is probably an error since this group seems to be confined to conifers.

Flight period: Collected from April to September.

Comparisons: *D. lugubris*, most often confused with *D. punctulata*, can be distinguished by its more strongly expanded lateral pronotal margins and more prolonged elytral apices.

5. *Dicerca punctulata* (Schönheer) (Figs. 2, 46, 68)

Buprestis punctulata Schönherr 1817: 123; Sturm, 1826, Cat. Käf., p. 15; Laporte & Gory 1837: 98, Pl. 25, Fig. 134; LeConte 1857: 7.

Buprestis transversa Say, 1825, Ann. Lyc. Nat. Hist. N. Y., 1: 249, LeConte 1857: 7; 1883 Compl. Writings Th.: 386.

Buprestis sylvatica Dejean 1837: 87 (nomen nudum).

Dicerca punctulata Melsheimer 1845: 145; Fitch, 1857, Trans. N. Y. Agr. Soc., 4: 706; LeConte 1860 (1859): 201; Glover, 1869, U. S. Dep. Agr. Rep. for 1868, p. 91; Pettit 1870: 102; E. Saunders 1871: 37; Crotch 1873: 86; Glover 1878: 11, Fig. 12; Zesch & Reinecke 1880: vii; Bowditch 1882: 27; F. Blanchard 1889: 30; Chittenden 1889: 217, 219; Packard 1890: 684; Kerremans 1892: 88; Hopkins, 1899, W. Va. Agr. Exp. Sta., Bull. 56, p. 436; Ulke 1902: 21; Kerremans 1903: 131; Felt 1906: 648, 656; Casey 1909: 154; J. B. Smith 1910 (1909): 292; Grossbeck, 1912, Jour. N. Y. Ent. Soc., 20: 135; Frost, 1915, Can. Ent., 47: 142; Nicolay, 1917, Bull. Brookl. Ent. Soc., 12: 92; Dozier, 1918, Ent. News, 29: 351; Britton 1920: 244; Knull 1920: 5; Leng 1920: 180; Knull 1922:



Fig. 4. Known geographic range of *Dicerca lugubris* LeConte.

80; 1925: 15, 16, Pl. 4, Fig. 4; Chamberlin 1926: 194, 195; Leonard 1928: 356; Obenberger 1930: 336; Brimley 1938: 171; Craighead 1950: 195; Franklin & Lund 1956: 24; Kirk, 1970, S. Car. Agr. Exp. Sta., Tech. Bull. 1038, p. 47.

Dicerca transversa Melsheimer 1845: 145.

Stenuris punctulata Melsheimer 1853: 62.

Dicerca pinorum Casey 1909: 154; Manee, 1913, Ent. News, 24: 168.

D i a g n o s i s : Moderately robust and convex, dark cupreous above and below, more shining below; upper surface with non-prominent smooth, elongate, black raised areas; elytral apices entire, only slightly produced; mesotibia of male simple; last abdominal sternite of female entire.

M a l e : Head flattened; coarsely, rugosely punctured with two weak, longitudinal raised areas on vertex and strongly raised transverse area on

front between eyes, punctured areas sparsely clothed with inconspicuous, semirecumbent white hair; antennae as in *D. tenebrosa*.

Pronotum with lateral margins parallel at base, weakly expanded just anterior of middle, then converging to narrowest at anterior angles; disk densely, confluently punctured, with four longitudinal, smooth raised areas, the lateral pair interrupted by oblique depression behind middle, median channel slightly impressed; semirecumbent white hair sparse and inconspicuous.

Elytra wider at base than pronotum, lateral margins slightly sinuate and gently expanded to widest part behind middle, then converging to slightly produced apices, apices entire; disk finely, densely, punctured, strial punctures larger and oblong; intervals with numerous inconspicuous, elongate, black raised areas.

Venter with prosternum coarsely, densely punctured; prosternal process with concave punctate channel bordered by smooth raised margins, channel moderately clothed with semierect white hair; meso- and metasterna less densely punctured medially; median concavity faint, extending to anterior part of first abdominal sternite; mesotibia simple; abdominal sternites densely punctured laterally, less so medially; semirecumbent white hairs inconspicuous; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 46).

Length 12.8 mm; width 4.9 mm.

Redescribed from a male in the author's collection from New York, West Point.

F e m a l e : Differs from male in having prosternal channel feebly concave, less hairy; apex of last abdominal sternite entire.

V a r i a t i o n : The punctured areas in fresh specimens have pruinescence. The color varies from cupreous to nearly black. The elytral tips are more produced in some and the lateral pronotal margins sometimes converge slightly from the base and then slightly expand. The pronotal width at the base is usually wider than or subequal to the width just anterior to the middle. The males vary from 9.0 to 14.8 mm long and from 3.6 to 5.3 mm wide; the females from 9.6 to 16.7 mm long and from 3.6 to 6.2 mm wide.

T y p e l o c a l i t y : Of *punctulata*, Georgia, location of type unknown; of *transversa*, Pennsylvania, type lost; of *pinorum*, North Carolina, Southern Pines, type (Casey collection, USNM).

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 2): From 257 specimens examined; Canada: Ontario, United States: Alabama, District of Columbia,

Florida, Georgia, Indiana, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Texas, Virginia, and Wisconsin.

H o s t : Knull (1920) lists it as breeding in *Pinus rigida* Miller. Chamberlin (1926) lists *Pinus strobus* L., *Pinus taeda* L., and *Pinus echinata* Miller.

F l i g h t p e r i o d : Collected from January to December.

C o m p a r i s o n s : Similar to *D. lugubris* but differs as indicated under that species.

6. *Dicerca dumolini* (Laporte & Gory) (Figs. 3, 47, 67)

Buprestis dumolini Laporte & Gory 1837: 98, Pl. 25, Fig. 133.

Dicerca consobrina Melsheimer 1845: 145.

Dicerca dumolini Marseul 1865, L'Abeille, 2: 148; E. Saunders 1871: 37; LeConte 1873: 331; Kerremans 1892: 87; 1903: 132; Casey 1909: 157; Leng 1920: 180; Leonard 1928: 357; Obenberger 1930: 329.

Dicerca tuberculata Chevrolat (not Laporte & Gory), 1838, Silberm. Rev. Ent., 5: 65; Chamberlin 1926: 199 (part).

D i a g n o s i s : Distinctively brassy-brown and densely punctured above with irregular, strongly raised, smooth black areas, beneath more cupreous; elytral apices entire, feebly produced; male mesotibia simple; last abdominal sternite of female acutely entire.

M a l e : Head coarsely, rugosely punctured, punctures finer on vertex, sparsely clothed with short, recumbent white hair; front flattened, with three smooth raised areas between eyes and two longitudinal areas on vertex; antennae extending to middle of pronotum at sides, third segment distinctly longer than second.

Pronotum with lateral margins parallel for basal one fourth then abruptly expanded to widest part just before middle, then converging to narrowest at anterior angles; disk densely, rugosely punctate with sparse inconspicuous white hair; longitudinal, smooth raised area extending from base to apex except for brief interruption at middle on each side of distinct median channel, channel with small raised area at middle; longitudinal, smooth raised area midway to lateral margin interrupted by oblique punctate depression; irregular raised area extending forward from hind angle.

Elytra wider at base than pronotum, lateral margins subparallel and sinuate to widest point just behind middle, then converging to feebly produced

entire apices; disk densely, rugosely punctured, with inconspicuous, short, recumbent white hair; striae indistinct but disk with some larger serial punctures; surface with numerous irregular, smooth, black raised areas, carinate near apices.

Venter with prosternum densely rugosely punctured; prosternal process concave, concavity densely punctured and extending to anterior part of first abdominal sternite; concavity densely clothed with white hair; metasternum with punctures sparse lateral to median concavity; mesotibia simple; abdominal sternites moderately punctured medially, densely and rugosely punctured laterally, punctures with recumbent white hair; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 47)

Length 14.7 mm; width 5.5 mm.

Redescribed from a male specimen in the author's collection (unknown locality) that compares favorably with a paratype sent by Mr. Descarpentries (MHNTP).

F e m a l e : Differs from male in being less densely clothed with hair ventrally; apex of last abdominal sternite acutely entire.

V a r i a t i o n : Fresh specimens may have the punctured areas obscured by white pruinescence. One specimen in the Ohio State University collection appears to have been mistreated chemically and it is colored a chocolate-brown. Not much structural variation was exhibited by the few specimens seen. The males vary from 13.8 to 14.7 mm long and from 5.1 to 5.5 mm wide; the females from 14.1 to 16.5 mm long and from 5.2 to 6.2 mm wide.

T y p e l o c a l i t y : Of *dumolini*, Senegal cited in error, type (MHNTP); of *consobrina*, Virginia, type lost. The synonymy is listed on the authority of citations by Casey (1909) and Obenberger (1930), conclusions with which I agree.

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 3): From 13 specimens examined. Canada: Quebec. United States: New York, Connecticut, Pennsylvania, New Jersey, and Virginia.

H o s t : From material examined it has been collected on "dead spruce", *Picea* sp., on "balsam fir", *Abies balsamea* (L.) Miller, and on *Pinus* sp.

F l i g h t p e r i o d : The only specimens with dates of capture were taken from May to September.

C o m p a r i s o n s : The brassy-brown color is rather distinctive of *D. dumolini* and the coarsely sculptured dorsal surface will also help to

distinguish it from those species most similar to it, namely *D. tuberculata*, *D. lugubris*, and *D. punctulata*. The lateral margins of the pronotum are more abruptly expanded than in *D. tuberculata* and *D. punctulata*.

7. *Dicerca tuberculata* (Laporte & Gory) (Figs. 5, 48, 70)

Buprestis tuberculata Laporte & Gory 1837: 99, Pl. 25, Fig. 135; White 1848: 19; LeConte 1857 a: 7.

Dicerca tuberculata Fitch, 1857, Trans. N. Y. Agr. Soc., IV, 4. Rep., p. 706; LeConte 1860 (1859): 201; Chevrolat, 1867, Ann. Soc. Fr., 7: 577; E. Saunders 1871: 37; Crotch 1873: 86; LeConte 1873: 331; Provancher 1877: 349; Glover 1878: pl. 38, Fig. 28 (without text); F. Blanchard 1889: 30; Packard 1890: 684; Gundlach 1891: 159, 160; Kerremans 1892: 89; Hamilton, 1893, Can. Ent., 25: 274; 1895: 364; Evans 1895: 146; Kerremans 1903: 132; Casey 1909: 157; Leng & Mutchler, 1914, Bull. Amer. Mus. Nat. Hist., 33, Art. 30, p. 430; Nicolay 1919: 17; Frost 1920: 232; Leng 1920: 180; Knull 1922: 80; 1925: 15, pl. 1, Fig. 17; Fisher 1925: 130, 131; Chamberlin 1926: 199; Frost 1928: 133, 134; Leonard 1928: 357; Obenberger 1930: 339, 340; Brimley 1938: 171; Kajihiro & Millsbaugh 1950: 542; Craighead 1950: 195; Franklin & Lund 1956: 25; Kirk, 1970, S. Car. Agr. Exp. Sta., Tech. Bull. 1038, p. 47.

Dicerca scobina Chevrolat, 1838, Silberm. Rev. Ent., 5: 66. New synonymy.

Stenurus tuberculata Melsheimer 1853: 63.

Dicerca hilaris LeConte 1860 (1859): 200; E. Saunders 1871: 37; Crotch 1873: 86; LeConte 1873: 331; Frost 1928: 134.

Dicerca manca LeConte 1860 (1859): 201; Pettit 1870: 102; Crotch 1873: 86; LeConte 1873: 331; Zesch & Reinecke 1880: vii; Frost 1928: 134.

Diagnosis: Moderately robust and convex; viridescent to copperous above and below, with numerous smooth, black areas above; elytral apices entire, slightly produced; mesotibia of male simple; last abdominal sternite of female acutely entire.

Male: Head flattened; coarsely, rugosely punctured with irregular raised areas on front and two longitudinal raised areas on vertex; punctured areas sparsely clothed by short recumbent white hair; antennae elongate, reaching to beyond middle of pronotum at sides, third segment distinctly longer than second.

Pronotum with lateral margins parallel at base, gradually expanded to just before middle, then converging to narrowest at anterior angles; disk densely punctured; median channel distinct with small, irregular, smooth area at middle and longitudinal, smooth raised area on either side of channel extending from base to apex; longitudinal, smooth raised area midway to

lateral margin interrupted by oblique depression; irregular raised areas extending forward from basal angles; short recumbent white hair inconspicuous or absent.

Elytra wider at base than pronotum, lateral margins subparallel and slightly sinuate to widest just behind middle, then converging to slightly produced apices, apices obliquely truncate; disk densely, rugosely punctured, strial punctures larger; surface with numerous irregular, smooth, black raised areas becoming carinate toward apices; punctate areas sparsely clothed by recumbent white hair.

Venter with prosternum densely, rugosely punctured, with transverse depression near anterior margin; prosternal process moderately concave; concavity more pronounced on metasternum, extends to anterior part of first abdominal sternite; short semirecumbent white hair moderate on prosternum, punctures and hair becoming more sparse on metasternum; mesotibia simple; abdominal sternites moderately punctured, rugose laterally with inconspicuous recumbent white hair; apex of last abdominal sternite emarginate.

Male genitalia (Fig. 48) narrow at base, moderately expanded toward apex.

Length 15.7 mm; width 6.0 mm.

Redescribed from a male in the author's collection from Michigan that compares favorably with a homotype determined by Mr. Descarpentries of Paris.

Female: Differs from male in having ventral concavity less pronounced; apex of last abdominal sternite acutely entire.

Variation: This species varies most in the coloration of its punctured areas which are usually cupreous toward the midline above and iridescent green laterally but may be uniformly cupreous or uniformly green. The sculpturing is fairly uniform, but the lateral margins of the pronotum are more strongly expanded in some and the elytral apices may be entire instead of truncate. The males vary from 14.7 to 19.0 mm long and from 5.2 to 7.0 mm wide; the females from 12.9 to 19.0 mm long and from 4.9 to 7.0 mm wide.

Type locality: Of *tuberculata*, Boreal America, type (MHNP); of *scobina*, Massachusetts, Boston, type (BMNH); of *hilaris* (♀), New York, Brooklyn (MCZ, No. 2659); of *manca* (♂), New York, New York (MCZ, No. 2660).

Geographical distribution (Fig. 5): From 64 specimens examined. Canada: Nova Scotia, New Brunswick, Ontario, and Quebec. United States: Connecticut, Maine, Michigan, New Hampshire, New York, North Carolina, Pennsylvania, and Virginia. This species has been recorded by Gundlach (1891) from Havana, Cuba (probably introduced from USA).

Host: From material examined *D. tuberculata* has been taken on: Jack pine, *Pinus banksiana* Lambert, *Picea glauca* (Moench) Voss, balsam fir, *Abies balsamea* (L.) Miller, and on larch, *Larix laricina* (DuRoi) Koch, trunks. Knull (122) records it ovipositing in a log of hemlock, *Tsuga canadensis* (L.) Carriere, and Felt (1906) records it from arbor vitae, *Thuja occidentalis* L.

Flight period: Collected from April to October.

Comparisons: Closely similar to *D. dumolini* but differs as indicated under that species. Superficially it is similar to some specimens of *D. tenebrosa* but the males of the latter have the mesotibia toothed and the females have the last abdominal sternite tridentate.

8. *Dicerca pectorosa* LeConte (Figs. 6, 49, 71)

Dicerca pectorosa LeConte, 1857 b Rep. Pac. Explor. 47th Parallel, Ins., 12: 45; 1860 (1859): 203; E. Saunders 1871: 37; Crotch 1873: 86; Kerremans 1892: 88; Fall, 1901, Occ. Papers Calif. Acad. Sci., 7: 116; Kerremans 1903: 132; Gibson, 1908, 38. Rep. Ent. Soc. Ont., p. 126; Casey 1909: 165; Woodworth 1913: 196; Chamberlin 1917 a: 130 (*pecterosa*, misspelled); 1920, Ent. News, 31: 244; Leng 1920: 180; Chamberlin, 1921 a Ore. Agr. Exp. Sta., Corvallis. pp. 106—108; 1921 b Rev. Appl. Ent. A 9: 165; Lovett & Barss, 1923, Ore. Agr. Exp. Sta., Circ. 42, p. 6; 1924 b Rev. Appl. Ent. A 12: 332; Chamberlin 1924 a: 185 (*pecterosa*, misspelled); Van Dyke, 1924, Pan-Pac. Ent., 2: 18; Chamberlin 1926: 191 (*pecterosa*, misspelled); Essig 1926: 397; Chamberlin 1929: 114; Obenberger 1930: 334; Chamberlin, 1932, Jour. Econ. Ent., 25: 833; Beer & Hatch 1941: 106; Knowlton & Wood 1948: 43; Nelson, 1959, Bull. Brookl. Ent. Soc., 54: 23; Barr 1971: 58.

Diagnosis: Dark cupreous-black above, more cupreous below; upper surface with numerous irregular raised areas evident; elytral apices entire, moderately prolonged; mesotibia of male simple; last abdominal sternite of female truncately entire.

Male: Head flattened, coarsely, rugosely punctured with irregular, smooth raised areas and semirecumbent white hair; antennae reaching almost to middle of pronotal sides.

Pronotum with lateral margins subparallel at base, strongly expanded at middle and then converging to narrowest at anterior margin; disk with irregular surface, smooth raised areas bordering median channel, another midway to lateral margin interrupted by oblique depression behind middle and with irregular raised areas near lateral margin; punctures coarse and rugose laterally, smaller medially; white hair short, inconspicuous.

Elytra slightly wider at base than pronotum; lateral margins sinuately subparallel from base to middle, then converging to moderately prolonged, entire apices; disk with numerous black raised areas interspersed with punctate areas, large strial punctures more evident medially; short, white, semi-recumbent hair inconspicuous.

Venter coarsely, rugosely punctured laterally, with smooth sparsely punctured areas bordering punctured median concave channel, concavity extending from prosternum to first abdominal sternite; prosternum with transverse impression near distinctly bisinuate anterior margin; punctured areas with moderate, semirecumbent white hair; mesotibia simple; last abdominal sternite truncately entire.

Male genitalia (Fig. 49) with lateral margins of parameres toward apices reflexed dorsally.

Length 15.5 mm; width 5.5 mm.

Redescribed from a male homotype in the author's collection from Oregon, Corvallis.

F e m a l e : Externally closely similar to male.

V a r i a t i o n : The color varies from cupreous to almost black. The males vary from 11.8 to 16.2 mm long and from 4.2 to 5.8 mm wide; the females from 11.4 to 18.0 mm long and from 4.0 to 6.7 mm wide.

T y p e l o c a l i t y : Oregon, type (MCZ, No. 2663).

G e o g r a p h i c a l D i s t r i b u t i o n (Fig. 6): From 206 specimens examined. Canada: British Columbia, Ontario (maybe accidental), and Saskatchewan. United States: California, Colorado, Idaho, Nebraska, Nevada, Oregon, Utah, and Washington.

H o s t : From material examined *D. pectorosa* has been reared from prune and plum trees in Oregon and has been taken on the following: peach trees, *Prunus virginiana* var. *demissa* (Nuttall) Sargent, *Ceanothus integrifolius* Hooker and Arnott, and *Chrysothamnus viscidiflorus* (Hooker) Nuttall.

F l i g h t P e r i o d : Collected from March 3 to November.



Fig. 5—6: Known geographic ranges of Fig. 5, *D. tuberculata* (Laporte & Gory);
Fig. 6, *D. pectorosa* LeConte.

Comparisons: This species resembles those of the *tenebrosa* group somewhat but differs in having the last visible abdominal sternite truncate in both sexes.

9. *Dicerca callosa* Casey (Figs. 7, 8, 27, 37, 38, 50, 72, 73)

Dicerca callosa Casey 1909: 150.

Diagnosis: Moderately robust, convex; bronzy to cupreous black above, more distinctly brassy or cupreous below; small black raised areas on elytra inconspicuous; elytral apices entire, moderately to strongly produced; mesotibia of male simple with a slight dilation on inner margin; last abdominal sternite of female tridentate.

Type locality: New York, type (USNM).

Geographical Distribution (Figs. 7, 8): Most of Canada, and in the United States, the northern tier of states and the western states including the rocky mountains states.

Hosts: Both subspecies have been collected commonly on *Populus tremuloides* Michaux which is probably its host.

Comparisons: Most closely similar to *D. tenebrica* and *D. hesperoborealis* but *D. callosa* differs by the pronotum being more convex and the males lacking a tooth on the inner margin of the mesotibia. It also lacks the strong median antecoxal groove of *D. hesperoborealis*.

Two subspecies can be recognized.

9a. *Dicerca callosa callosa* Casey (Figs. 7, 37, 50, 72)

Dicerca callosa Casey 1909: 150; Obenberger 1930: 326; Nelson 1963: 65—69; Benoit, 1965, Can. Dep. Forest., Bimon. Prog. Rep., 21: 2; Barr 1971: 60.

Dicerca pertinax Casey 1909: 147 (subsp. of *subcuprea*); Obenberger 1930: 338.

New synonymy.

Dicerca rigida Casey 1909: 151; Obenberger 1930: 337. **New synonymy.**

Dicerca tetrica Casey 1909: 151; Obenberger 1930: 339. **New synonymy.**

Dicerca prolongata Leng 1920: 180 (part); Chamberlin 1926: 192, 193 (part).

Dicerca tenebrica Craighead 1950: 195 (part).

Male: Convex; bronzy or cupreous-black above, more cupreous beneath. Head flattened, front and vertex slightly impressed; coarsely, rugosely punctate, punctured areas with moderately long, semierect white hairs; antennae reaching middle of pronotum at sides, second and third segments subequal in length, outer joints broad, seventh as broad as long (Fig. 37).

Pronotum with width to length average ratio 1.60 to 1; lateral margins subparallel or slightly converging before base, gently expanded at middle, then converging to narrowest at anterior angles; disk strongly convex; coarsely, confluent punctate; pair of longitudinal raised areas extending from base to anterior margin, separated by distinctly punctate median channel, channel with deep depression at posterior extreme; another indistinct pair of longitudinal raised areas, midway to lateral margin, interrupted by oblique depression; irregular raised area nearer lateral margin; semirecumbent white hair inconspicuous.

Elytra wider at base than pronotum, lateral margins subparallel to widest part behind middle, then converging to distinctly produced apices, apices entire; disk confluent punctured on much of surface, punctures of striae larger; striae distinct, especially toward suture; intervals with numerous irregular and inconspicuous black raised areas becoming carinate toward apices.

Venter with prosternum densely, rugosely punctured, with transverse depression near bisinuate anterior margin; prosternal process transversely rugose, longitudinally concave, with smooth, raised, lateral borders, concavity with dense white hair and extending to anterior part of first abdominal sternite; meso- and metasternum with smooth, sparsely punctured areas bordering median channel, more coarsely and densely punctured laterally; antecoxal piece with median carina; mesotibia with slight dilation on inner margin but no tooth; abdomen rugosely punctured, rugae longitudinal medially; last abdominal sternite with median smooth area at base and two longitudinal ones extending from near base to emarginate apex.

Male genitalia (Fig. 50).

Length 16.5 mm; width 6.0 mm.

Redescribed from a male homotype in the author's collection from Canada, Manitoba, Berens River.

F e m a l e : Differs from male in having ventral concavity less densely clothed with hair; mesotibia without slight dilation; apex of last abdominal sternite tridentate.

V a r i a t i o n : The color varies from brassy-cupreous to black. The lateral pronotal margin is sometimes not expanded at the middle, and the elytral apices are but moderately produced in some. The males vary from 12.5 to 19.7 mm long and from 4.2 to 7.0 mm wide; the females from 12.3 to 18.5 mm long and from 4.5 to 6.6 mm wide.

Type locality: Of *callosa*, New York (USNM, No. 35839); of *pertinax*, New Hampshire (USNM, Neotype, No. 35832); of *rigida*, Michigan, Lake Superior, Whitefish Point; of *tetrica*, Ontario, Port Hope, all types (Casey collection, USNM).

Geographical distribution (Fig. 7): From 195 specimens examined. Canada: Alberta, British Columbia, Manitoba, Northwest Territories, Ontario, Quebec, Saskatchewan, and Yukon Territories. United States: Alaska, Colorado, Maine, Michigan, Minnesota, New York, and North Dakota.

Host: From data on examined material *D. c. callosa* has been most commonly collected on *Populus tremuloides* Michaux which is probably the host. Also it has been taken on "Birch", "Willow", and *Pinus strobus* L. but the latter three may not prove to be host plants.

Flight period: Collected from May to September.

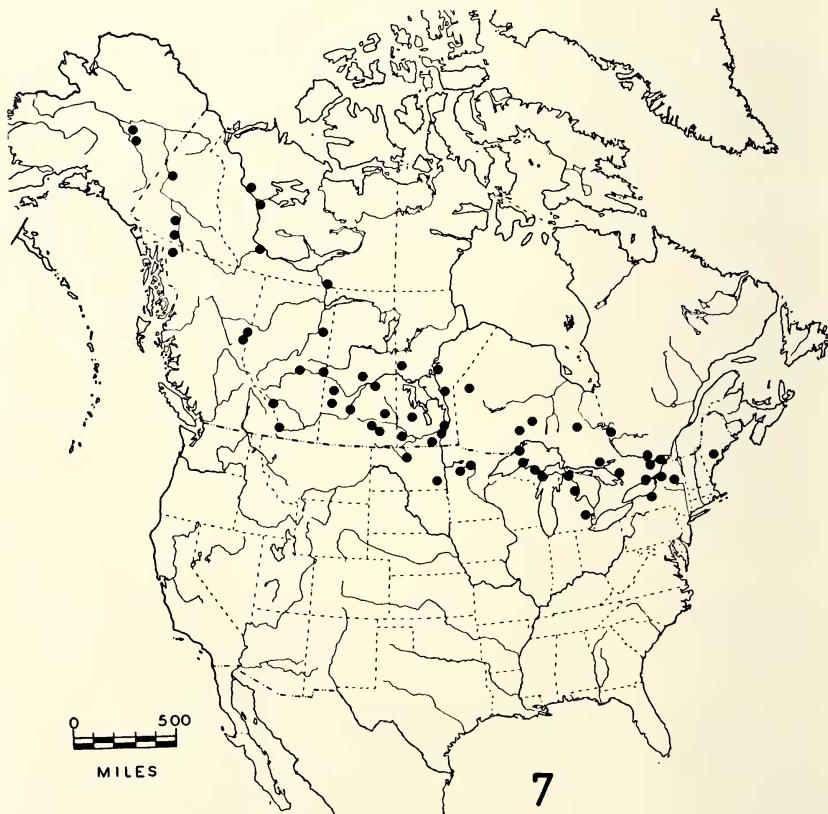


Fig. 7. Known geographic range of *Dicerca callosa callosa* Casey.

9b. *Dicerca callosa frosti* Nelson (Figs. 8, 27, 38, 73)

Dicerca frosti Nelson 1963: 65—69, Figs. 1—2; Barr 1971: 60.

Dicerca tenebrica Beer & Hatch 1941: 104 (part).

Dicerca prolongata Keen 1952: 190 (part).

This subspecies differs from *D. c. callosa* in averaging larger, with pronotal width to length average ratio 1.77 to 1, while in *D. c. callosa* it is 1.60 to 1; and in the antennal segments 7-11 being longer than wide (Fig. 38), while in *D. c. callosa* they are as wide or wider than long (Fig. 37).

Male genitalia as in *D. c. callosa* (Fig. 50).

Length (Holotype) 16.5 mm; width 6.0 mm.

F e m a l e : Differs from male as follows: is less hairy ventrally, lacks dilation on mesotibia (Fig. 27) and has last abdominal sternite tridentate.

V a r i a t i o n : The color varies from brassy and greenish to dark cupreous. The expansion of the pronotal lateral margins is less in some specimens. The elytral apices vary from moderately produced and blunt to strongly produced and narrow. The males vary from 14.5 to 20.0 mm long and from 5.0 to 7.2 mm wide; the females from 14.5 to 20.7 mm long and from 5.2 to 7.7 mm wide.



Fig. 8. Known geographic range of *Dicerca callosa frosti* Nelson.

Type locality: Holotype from Oregon, Harney County, Steens Mountains (CAS).

Geographical distribution (Fig. 8): From 336 specimens in the type series. Canada: Alberta, and British Columbia. United States: Arizona, California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming.

Host: This subspecies has been taken in various parts of its range from *Populus tremuloides* Michaux.

Flight period: Collected from April to August.

This subspecies was originally described as a valid species (Nelson, 1963) but is now appears to be a subspecies of *D. callosa* differing as indicated above.

10. *Dicerca tenebrica* (Kirby) Figs. 9, 30, 33, 51, 76)

Buprestis tenebrica Kirby, 1837, Fauna Bor. Amer., 4: 155; White 1848: 20; Bethune, 1872, Can. Ent. 4: 32.

Stenurus tenebrica Melsheimer 1853: 63.

Dicerca tenebrica Lacordaire 1857: 36; Kerremans 1903: 131; Casey 1909: 149; Fall 1926: 192, 193; Obenberger 1930: 338; Leng & Mutchler 1933: 29; Van Dyke 1934: 90; Doane et al, 1936, Forest Insects, p. 158; R. E. Blackwelder 1939: 43; Beer & Hatch 1941: 104; Knowlton & Wood 1948: 43; Craighead 1950: 195; Nelson 1963: 65—69, Fig. 3; Barr 1971: 60, Pl. 6, Fig. 5.

Dicerca prolongata LeConte 1860 (1859): 194; E. Saunders 1871: 36; Crotch 1873: 84; Packard, 1877, Rep. U. S. Geol. Surv., pp. 589, 810; Glover 1878: Pl. 42, Fig. 11; LeConte, 1878, Proc. Amer. Phil. Soc., 17: 472; Hubbard & Schwarz 1878: 636; Cockerell, 1888, Ins. Life I, p. 58; Hamilton, 1889, Can. Ent., 21: 105; Blandford 1889: 29; Harrington 1890: 159; Kerremans 1892: 88; Cockerell, 1893, Trans. Amer. Ent. Soc., 20: 328; Evans 1895: 146; Cockerell, 1898, N. Mex. Exp. Sta. Bull. 28, p. 152; Holland, 1900, Ent. News, 9: 422; Evans, 1903, Can. Ent., 35: 291; Harvey, 1906, Bull. B. C. Ent. Soc., 4; Felt 1906: 746; Fall & Cockerell, 1907, Trans. Amer. Ent. Soc., 33: 179; Casey 1909: 149; Wickham 1911: 23; Watson 1911, Nat. Resources N. Mex., p. 108; Woodworth 1913: 196; Brittain, 1913, Proc. Ent. Soc. B. C., 2: 16; Burke, 1917a: Pl. 4, Fig. 1; 1917b, Jour. Econ. Ent., 10: 326; Nicolay, 1917, Bull. Brookl. Ent. Soc., 12: 92; Chagnon 1917: 217; Chamberlin 1917a: 129; Swaine, 1919, Rep. Can. Arctic Exped. 1913—18, p. 13 E; Knull 1920: 5; Hofer, 1920, U. S. Dep. Agr. Farm. Bull. 1154, p. 10; Britton 1920: 243; Leng 1920: 180; Hofer, 1921, Rev. Appl. Ent., A9: 31; Knull 1922: 80; Chamberlin 1924a: 185; Hatch, 1924, Mich. Acad. Arts & Letters, 4: 571; Knull 1925: 11; Essig 1926: 397; Chamberlin 1926: 192; Leonard 1928: 356; Stace Smith 1929: 71; Chamberlin 1929: 114; Obenberger 1930: 334, 335; Van Dyke 1934: 90; Trinkham, 1941, Jour.

N.Y. Ent. Soc., 49: 181; Knowlton & Wood 1948: 43; Kajihiro & Millspaugh 1950: 542; Keen 1952: 190.

Dicerca divaricata Kerremans 1892: 86; Brittain, 1913, Proc. Ent. Soc. B. C., 2: 16 (*divaricata*, misspelling); Ruhman, 1915, Proc. Ent. Soc. B. C., 7: 11; Chamberlin, 1932, Jour. Econ. Ent., 25: 833.

Dicerca subcuprea Casey 1909: 147; Obenberger 1930: 338. **New synonymy.**

Dicerca sulcatula Casey 1909: 147; Obenberger 1930: 338. **New synonymy.**

Dicerca subargentea Casey 1909: 148; Obenberger 1930: 338. **New synonymy.**

Dicerca severa Casey 1909: 149; Obenberger 1930: 337. **New synonymy.**

Dicerca longipennis Casey 1909: 150; Obenberger 1930: 335 (var. of *prolongata*).

Diagnosis: Elongate, moderately convex; aeneous to black or sometimes with bluish tint above, cupreous below; small black raised areas of elytra inconspicuous; elytral apices entire, moderately to strongly produced; mesotibia of male with inner tooth (Fig. 30); last abdominal sternite of female tridentate.

Male: Head flattened, front and vertex at middle slightly impressed; coarsely, rugosely punctate with irregular smooth raised areas, punctures with moderately long, semierect white hair; antennae reaching middle of pronotum at sides, outer joints triangular.

Pronotum with lateral margins subparallel at base, usually distinctly and angularly expanded at middle, then converging to narrowest at anterior angles; disk coarsely, confluent punctured, especially laterally; median punctate channel distinct, extending from base to near anterior margin, more impressed at base; pair of longitudinal, smooth raised areas bordering channel, another less distinct raised area midway to lateral margin interrupted by oblique depression just behind middle; sparse, semirecumbent white hair inconspicuous.

Elytra wider at base than pronotum, lateral margins subparallel to widest behind middle, then converging to strongly prolonged apices, apices entire; discal striae impressed, especially toward suture; intervals raised, smooth and interrupted by confluent punctate areas especially laterally and posteriorly, raised areas not prominent, intervals carinate apically.

Venter with prosternum densely, rugosely punctured, with transverse depression near bisinuate anterior margin; prosternal process strongly concave, with transverse rugae and smooth, raised lateral borders, concavity extending to anterior part of first abdominal sternite and clothed with dense long white hair; meso- and metasternum with smooth sparsely punctate areas bordering median channel, more coarsely and densely punctured laterally; antecoxal piece with strong median carina (Fig. 33); mesotibia with internal tooth (Fig. 30); abdomen rugosely punctured, rugae longitudinal medially;

last abdominal sternite with smooth area at middle of base and two longitudinal smooth areas extending from near base to emarginate apex, emargination sometimes with broad, short rectangular projection.

Male genitalia (Fig. 51)

Length 19.5 mm; width 6.5 mm.

Redescribed from a male in the author's collection from Michigan, Whitmore Lake, which compares favorably with the homotype (BMNH).

F e m a l e : Differs from male in having ventral concavity less hairy; mesotibia simple; and apex of last abdominal sternite tridentate.

V a r i a t i o n : The usually brassy-cupreous color is darkened in some with a bluish tint to almost black. In one female from Arizona the middle tooth of the tridentate last abdominal sternite is much reduced and is entirely absent in another from Minnesota. The males vary from 15.0 to 21.5 mm long and from 4.8 to 7.2 mm wide; the females from 14.5 to 26.0 mm long and from 4.5 to 9.0 mm wide.

T y p e l o c a l i t y : Of *tenebrica*, North America, 54° latitude, type supposedly in the BMNH but could not be located; of *prolongata*, Lake Superior, type (MCZ, No. 2653); of *subcuprea*, Michigan; of *sulcatula*, Colorado; of *subargentea*, Wisconsin, Bayfield; of *severa*, Ontario; of *longipennis*, British America; the types of the last six species (Casey collection, USNM).

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 9): From 1350 specimens examined. Canada: Throughout except Newfoundland. United States: Alaska, Arizona, California, Colorado, Connecticut, Georgia, Idaho, Illinois, Indiana, Iowa, Maine, Maryland, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Mexico, New York, Nevada, North Dakota, Oregon, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming.

H o s t : Evidently breeds in a variety of trees in the genus *Populus* and from material examined it has been collected on: *Populus trichocarpa* Hooker, *P. tremuloides* Michaux, and *P. angustifolia* James. From literature, Knull (1920) records it breeding in *Populus grandidentata* Michaux.

F l i g h t p e r i o d : Collected from March to November.

C o m p a r i s o n s : Resembles *D. divaricata* but *D. tenebrica* differs as indicated in the key in being less strongly convex and in the shape of the penis of the male genitalia. From *D. hesperoborealis* it differs as indicated in the key and from *D. callosa* and *D. frosti* as discussed under those sub-species.

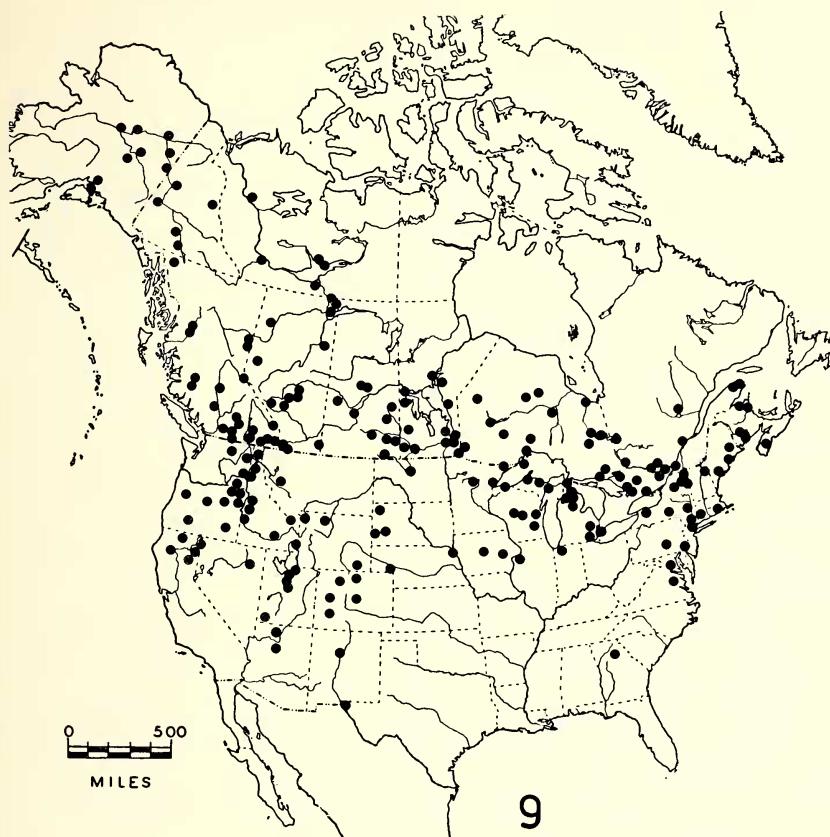


Fig. 9. Known geographic range of *Dicerca tenebrica* (Kirby).

11. *Dicerca hesperoborealis* Hatch & Beer (Figs. 10, 34, 52, 74)

Dicerca hesperoborealis Hatch & Beer, 1938, Pan-Pac. Ent., 14: 151; Blackwelder 1939: 43; Beer & Hatch 1941: 104; Knowlton & Wood 1948: 43; Nelson 1963: 65—69; Barr 1971: 59.

Diagnosis: Elongate, moderately convex; brassy to cupreous above, elytral tips and ventral surface distinctly cupreous; small black raised areas of elytra inconspicuous; elytral apices entire, strongly produced; mesotibia of male with inner tooth; antecoxal piece with carina deeply grooved (Fig. 34); last abdominal sternite of female tridentate.

Male: Head flattened, front and vertex slightly impressed at middle; coarsely, rugosely punctate with irregular smooth raised areas, punctures

with moderately long, semierect white hair; antennae similar to *D. tenebrica*.

Pronotum with lateral margins subparallel at base, expanded at middle, then converging to narrowest at anterior angles; disk coarsely, confluent punctured, especially laterally; median punctate channel more impressed near anterior and posterior margins; pair of longitudinal, smooth raised areas bordering channel, another longitudinal raised area midway to lateral margin interrupted by oblique depression just behind middle, and a variable raised area anterior to basal angle; sparse, semirecumbent white hair inconspicuous.

Elytra wider at base than pronotum, lateral margins subparallel to widest behind middle, then converging to strongly produced apices, apices entire; discal striae impressed, especially toward suture; intervals raised, smooth and interrupted by confluent punctate areas especially laterally and posteriorly, raised areas not prominent, intervals carinate apically.

Venter similar to that of *D. tenebrica* but differs in prosternal concavity with sparse short white hair; and median carina of antecoxal piece with strong median groove (Fig. 34).

Male genitalia (Fig. 52) with slender prolongation of penis.

Length 18.0 mm; width 6.0 mm.

Redescribed from a male homotype in the author's collection from Canada, British Columbia, Vernon.

Female: Differs from male in being less concave at midline ventrally; mesotibia simple; apex of last abdominal sternite tridentate.

Variation: This western species varies in color from brassy-cupreous to dark cupreous. Occasional specimens have the lateral margins of the pronotum less expanded. The males vary from 16.5 mm to 20.0 mm long and from 5.7 to 6.9 mm wide; the females from 15.5 to 20.0 mm long and from 5.5 to 7.2 mm wide.

Type locality: Washington, Wawawai, in Hatch collection, University of Washington, Seattle, Washington.

Geographical distribution (Fig. 10): From 210 specimens examined. Pacific coast states from northern California to British Columbia, Idaho, Nevada, and Utah.

Host: From material examined *D. hesperoborealis* has been reared from *Betula occidentalis* Hooker, *Alnus* sp. and has been collected on *Betula microphylla* Bunge, and *Alnus tenuifolia* Nuttall.

Flight period: Collected from March 5 to November 16.

Comparisons: From *D. tenebrica*, *D. divaricata*, *D. frosti* and *D. callosa*, species it closely resembles, *D. hesperoborealis* can be distinguished by the deep median groove of the antecoxal piece and the distinctive, male genitalia. The expanded lateral margins of the pronotum and male genitalia of *D. hesperoborealis* will serve to distinguish it from *D. caudata*.

12. *Dicerca divaricata* (Say) (Figs. 10, 35, 53, 77)

Buprestis divaricata Say, 1823, Jour. Acad. Nat. Sci. Phila., 3: 163; Kirby, 1837, Fauna Bor. Amer., 4: 154; Dejean 1837: 87; White 1848: 20; Bethune, 1872, Can. Ent., 4: 31; Washburn, 1892, Ore. Exp. Sta. Bull. 18, p. 10.

Dicerca dubia Melsheimer 1845: 142; LeConte, 1850, Coleopt. L. Superior, p. 227; 1860 (1859): 195.

Dicerca aurichalcea Melsheimer 1845: 142; LeConte, 1860 (1859): 195; Casey 1909: 145; Obenberger 1930: 326.

Dicerca parumpunctata Melsheimer 1845: 143; LeConte 1860 (1859): 195; Casey 1909: 145; Obenberger 1930: 334.

Dicerca divaricata LeConte, 1850, Remarks Coleopt. L. Superior, Bupr., p. 227; Harris, 1852, Ins. Inj. Veg., p. 42; LeConte, 1860 (1859): 195; Harris, 1862, Ins. Inj. Veg. (3rd Ed.), p. 48; 1869, Boston Soc. Nat. Hist., 1: 357; Glover, 1869, U. S. Dep. Agr. Rep. 1868, p. 91; Jones, 1870, Contrib. Nat. Hist. Nova Scotia, Ins. Coleopt., 1: 8; Riley, 1870, Amer. Ent. and Bot., 2: 103; Weilandy, 1870, Amer. Ent. & Bot., 2: 148; Pettit 1870: 102; Glover, 1871, U. S. Dep. Agr. Rep. 1870, p. 65; E. Saunders 1871: 36; Crotch 1873: 85; Thomas, 1876, 6. Rep. 111. Ent., p. 112; Provancher 1877: 348; Glover 1878: Pl. 10, Fig. 5; Hubbard & Schwarz 1878: 638, 655; Zesch & Reinecke 1880: vii; Bowditch 1882: 27; Riley, 1883, 3 Rep. U.S. Ent. Comm., p. 25; LeConte 1883: 590; Harrington, 1884, 14. Rep. Ent. Soc. Ont., p. 30; Caufield, 1886, Can. Ent., 18: 196; Harrington, 1887, 17. Rep. Ent. Soc. Ont., p. 30; Cockerell, 1888, Ins. Life, 1: 58; 1888, Can. Ent. 5: 178; Hamilton 1888: 64; Blanchard 1889: 29; Chittenden 1889: 219; Harrington 1890: 51; Packard 1890: 328, 386, 424, 519, 530; Martin, 1890, Prairie Farm., Sep., p. 7; G. W. Smith, 1891, Ins. Life, p. 422; Kerremans 1892: 86; Hopkins 1893: 181; Harrington, 1894, Can. Ent., 26: 15; Slosson, 1894, Ent. News, 5: 6; Evans 1895: 145; Hamilton 1895: 364; Daggett, 1895, Ent. News, 6: 313; Bowditch, 1896, Psyche, 7, Suppl. 2: 6; Harrington, 1897, 27. Rep. Ent. Soc. Ont., p. 70; Lugger, 1899, Minn. Exp. Sta. Bull. 66, p. 136; 1899, 5. Ann. Rep. Ent. St. Exp. Sta. Minn., p. 52; Pettit, 1900, Mich. Exp. Sta. Bull. 186, p. 41; Scott, 1901, Bur. Ent. Bull. 31, p. 36; Felt, 1901, 17. Rep. N.Y. St. Ent., p. 834; Ulke 1902: 21; McGillivray & Houghton, 1902, Ent. News, 13: 251; Kerremans 1903: 131; Pettit, 1904, Mich. Spec. Bull. 24, p. 419; Washburn, 1904, Univ. Minn. Exp. Sta. Bull. 84, p. 82; Schaeffer, 1905, Bull. Brookl. Mus., 1: 147; Kellogg, 1905, Amer. Ins., p. 267; Felt 1906: 428, 457; Gibson, 1907, 37. Rep. Ent. Soc. Ont., p. 80; Houghton, 1908, Can. Ent., 40: 160; Morris, 1908, Can. Ent., 40: 443; Easton, 1909,

Psyche, 16: 50; *Casey* 1909: 144; *J. B. Smith* 1910 (1909): 292; *Blatchley* 1910: 781; *Winkham* 1911: 23; *Sorauer & Reh*, 1913, *Handb. Pflanzenkrankheiten*, 3: 485; *Comstock*, 1914, *Man. Ins.*, p. 549; *Adams*, 1915, *Bull. Ill. St. Lab. Nat. Hist.*, XI, Art. II, p. 147; *Johnson*, 1915, *Ent. News*, 26: 312; *Somes*, 1915, *Mo. Fru. Exp. Sta. Bull.* 22, p. 13; *Frost*, 1915, *Can. Ent.*, 47: 142; *Ruhman*, 1915, *Proc. Ent. Soc. B. C.*, pp. 7—11; 1917, *Rev. Appl. Ent. A*, 4: 25 (references); *Nicolay*, 1917, *Bull. Brookl. Ent. Soc.*, 12: 92; *Chagnon* 1917: 217; *Morris*, 1919, *Can. Ent.*, 51: 50; *Knull* 1920: 5; *Britton* 1920: 243; *Rohwer*, 1920, *Proc. U. S. Nat. Mus.*, 57: 446, 459, 469; *Leng* 1920: 180; *Knull* 1922: 80; *Blackmann & Stage*, 1922, *Tech. Pub.* 17, N.Y. St. Coll. Forest. (Syracuse Univ.), 24: 60—61, Pl. 8, Fig. 29; *Comstock*, 1923, *Man. Stud. Ins.* (17th Edit.), p. 549, Fig. 662; *Hatch*, 1924, *Mich. Acad. Art. & Letters*, 4: 571; *Mundinger*, 1924, N.Y. St. Coll. Forest., *Tech. Pub.* 17, Pt. 4, p. 315; *Fisher* 1925: 130, 132, 133; *Knull* 1925: 11; *Good*, 1925, *Ann. Amer. Ent. Soc.*, 18: 258, 272, Fig. 22, 23 (wing venation); *Essig* 1926: 396; *Chamberlin* 1926: 183; *Leonard* 1928: 355; *Obenberger* 1930: 331; *Knull* 1932: 45; *Brimley* 1938: 171; *Blackwelder & Blackwelder* 1948: 20; *Knowlton & Wood* 1948: 43; *Kajihiro & Millspaugh* 1950: 542; *Craighead* 1950: 195; *Keen* 1952: 190; *Franklin & Lund* 1956: 24, Pl. 4, A.

Stenurus divaricata Melsheimer 1853: 62.

Stenurus aurichalcea Melsheimer 1853: 62.

Stenurus parumpunctata Melsheimer 1853: 62.

Dicerca subaequalis *Casey* 1909: 143; *Chamberlin* 1926: 181 (= *caudata*); *Obenberger* 1930: 338. **New synonymy.**

Dicerca nigra *Casey* 1909: 143; *Chamberlin* 1926: 181 (= *caudata*); *Obenberger* 1930: 332. **New synonymy.**

Dicerca limula *Casey* 1909: 144 (subsp. of *divaricata*); *Chamberlin* 1926: 184; *Obenberger* 1930: 329.

Dicerca incisa *Casey* 1909: 144 (subsp. of *divaricata*); *Chamberlin* 1926: 184; *Obenberger* 1930: 329.

Dicerca aestiva *Casey* 1909: 146; *Chamberlin* 1926: 184; *Obenberger* 1930: 325.

Dicerca rustica *Casey* 1909: 146; *Chamberlin* 1926: 184 *Obenberger* 1930: 337.

Dicerca vancouveri *Casey* 1909: 148; *Chamberlin* 1926: 200; *Obenberger* 1930: 340.

New synonymy.

Dicerca angusticauda *Casey* 1909: 148; *Chamberlin* 1926: 192 (= *prolongata*); *Obenberger* 1930: 326. **New synonymy.**

Diagnosis: Elongate rather strongly convex; aeneous to cupreous or with greenish tint above and below, elytral tips usually more distinctly cupreous; small black raised areas of elytra inconspicuous; elytral apices entire or truncate, usually divaricate; mesotibia of male with inner tooth; antecoxal piece with carina narrowly grooved (Fig. 35); last abdominal sternite of female tridentate.

Male: Head flattened; coarsely, rugosely punctate with irregular smooth raised areas, punctures with moderately long, semierect white hair; antennae similar to those of *D. tenebrica*.

Pronotum with lateral margins subparallel at base, gently expanded at middle, then converging to narrowest at anterior angles; disk with median punctate channel weakly impressed and bordered by elongate smooth areas, another elongate smooth area midway to lateral border is ill defined and interrupted behind middle by oblique depression, irregular raised areas near lateral margins; punctures of disk more coarse and confluent laterally; semi-recumbent white hair inconspicuous.

Elytra wider at base than pronotum, lateral margins subparallel to widest behind middle, then converging to distinctly produced apices, apices truncately entire, sutural angle weakly produced; disk with striae impressed, especially toward suture; intervals with numerous nonprominent, black raised areas, discal intervals carinate apically.

Venter essentially as in *D. tenebrica* except carina of antecoxal piece with narrow midline groove (Fig. 35).

Male genitalia (Fig. 53).

Length 18.5 mm; width 6.0 mm.

Redescribed from a male in the author's collection from Maryland, 2 miles east of Silver Spring.

Female: Differs from male in being less concave and less hairy at midline ventrally; mesotibia simple; apex of last abdominal sternite tridentate.

Variation: In color *D. divaricata* varies from bright aeneous or viridoaeneous to dark cupreous. The degree of expansion of the lateral pronotal margins varies and the median channel of the pronotum, usually faint, is sometimes moderately developed. The males vary from 15.0 to 20.0 mm long and from 5.0 to 6.7 mm wide; the females from 15.1 to 22.0 mm long and from 5.1 to 7.5 mm wide.

Type locality: Of *divaricata*, United States, type destroyed; of *dubia*, Pennsylvania; of *aurichalcea*, Virginia; of *parumpunctata*, Pennsylvania, the types of the latter three species should be in the MCZ but could not be located; of *subaequalis*, Pennsylvania, Allegheny, type (Casey collection, USNM) as are the types of the next seven species; of *nigra*, New York, Adirondack Mountains; of *limula*, New York, Buffalo; of *incisa*, Indiana; of *aestiva*, Vermont, Bennington County; of *rustica*, New Hampshire,

Hampton; of *vancouveri*, British Columbia, Victoria (probably mislabelled); of *angusticauda*, Wisconsin.

Geographical distribution (Fig. 10): From 1060 specimens examined. Canada: Alberta, Manitoba, New Brunswick, Nova Scotia, Ontario, and Quebec. United States: Alabama, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, Texas, Utah, Vermont, Virginia, West Virginia, and Wisconsin. This species has been recorded by Fisher (1925) from Haiti (probably introduced from the USA).

Host: Breeds in a variety of deciduous trees. From literature, Knull (1920, 1932) records rearing it from: *Acer saccharum* Marsh, *A. pennsylvanicum* L., *Betula lenta* L., *Cercis canadensis* L., *Fraxinus americana* L., *F. nigra* Marshal, *Ostrya virginiana* K. Koch, *Quercus alba* L., *Q. rubra* L., and *Ulmus americana* L. From material examined it has also been collected on: *Acer rubrum* L., *A. negundo* L., *Betula lutea* Michx., *Prunus* sp., *Fagus grandifolia* Ehrhart, *Populus* sp., *Pinus* sp., and *Abies* sp. (the last three probably not hosts).

Flight period: Collected from March 6 to November 15.

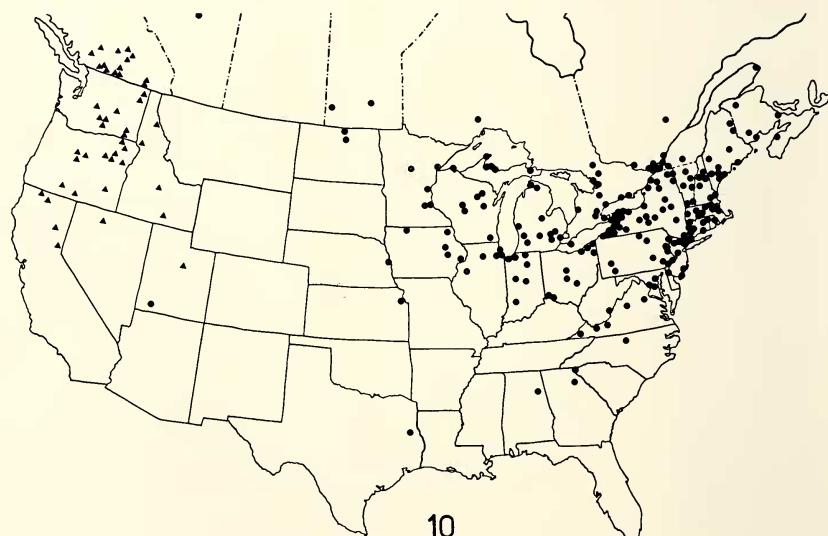


Fig. 10. Known geographic ranges of *Dicerca hesperoborealis* Hatch & Beer (triangles) and *D. divaricata* (Say) (circles).

Comparisons: Most closely resembles *D. caudata* but *D. divaricata* differs as indicated in the key. From *D. tenebrica* it differs as discussed under that species.

13. *Dicerca caudata* LeConte (Figs. 11, 54, 75)

Dicerca caudata LeConte 1860 (1859): 195; E. Saunders 1871: 36; Crotch 1873: 85; Blanchard 1889: 29; Ulke 1902: 21; Casey 1909: 142; Blatchley 1910: 781; Kwiat, 1915, Ent. News, 26: 237; Gibson, 1918, 48. Rep. Ent. Soc. Ont., p. 112; Nicolay 1919: 18; Frost 1920: 27; Britton 1920: 243; Leng 1920: 180; Knull 1922: 80; 1925: 12; Chamberlin 1926: 181; Leonard 1928: 356; Obenberger 1930: 326; Kajihiro & Millspaugh 1950: 542; Craighead 1950: 195.

Dicerca divaricata Kerremans 1892: 86 (part).

Dicerba abrupta Casey 1909: 140; Chamberlin 1926: 181; Obenberger 1930: 325

Dicerca biangulata Casey 1909: 140; Chamberlin 1926: 181; Obenberger 1930: 326

Dicerca inflatula Casey 1909: 140; Chamberlin 1926: 181; Obenberger 1930: 330.

Dicerca pisciformis Casey 1909: 141; Obenberger 1930: 334. **New synonymy.**

Dicerca longicauda Casey 1909: 141; Chamberlin 1926: 181; Obenberger 1930: 334 (var of *pisciformis*).

Dicerca cupreola Casey 1909: 141; Chamberlin 1926: 181; Obenberger 1930: 327.

Dicerca filiola Casey 1909: 142; Chamberlin 1926: 181; Obenberger 1930: 327 (var. of *cupreola*).

Diagnosis: Rather elongate, moderately convex; cupreous above, more strongly so below and on elytral tips; small black raised areas of elytra inconspicuous; elytral apices entire or truncate, usually divaricate; mesotibia of male with inner tooth; last abdominal sternite of female tridentate.

Male: Head and antennae essentially as in *D. divaricata*.

Pronotum with lateral margins widest at base, subparallel to middle, then strongly converging to narrowest at anterior angles; disk convex, coarsely, rugosely, punctured, especially laterally, with smooth longitudinal raised areas bordering median channel, another longitudinal raised area midway to lateral margin and irregular raised areas near lateral margin.

Elytra wider at base than pronotum; lateral margins subparallel to behind middle, then converging to strongly produced apices, apices truncately entire and divaricate; discal striae weakly impressed, intervals with numerous, inconspicuous, black raised areas, discal intervals carinate apically.

Venter essentially as in *D. hesperoborealis*; mesotibia with internal

tooth; apex of last visible abdominal sternite emarginate, with broad short rectangular projection.

Male genitalia (Fig. 54).

Length 16.5 mm; width 5.5 mm.

Redescribed from a male homotype in the author's collection from Michigan, Roscommon County.

F e m a l e : Differs from male in having ventral midline less concave and less hairy; mesotibia simple; apex of last abdominal sternite tridentate.

V a r i a t i o n : The color of *D. caudata* varies from the usual cupreous to almost black and the elytral apices are not divaricate in some. The males vary from 13.9 to 18.0 mm long and from 4.9 to 6.3 mm wide; the females from 13.1 to 19.0 mm long and from 4.8 to 6.7 mm wide.



Fig. 11. Known geographic range of *Dicerca caudata* LeConte.

Type locality: Of *caudata*, "middle states", type (MCZ, No. 2654); of *abrupta*, Massachusetts, type (Casey collection, USNM) as are the types of the next six species; of *biangulata*, New Hampshire, Hampton; of *inflatula*, Massachusetts; of *pisciformis*, Massachusetts; of *longicauda*, Massachusetts; of *cupreola*, Massachusetts; of *filiola*, Massachusetts.

Geographical distribution (Fig. 11): From 288 specimens examined. Canada: British Columbia, Manitoba, New Brunswick, Northwest Territories, Nova Scotia, Ontario, Quebec, and Saskatchewan. United States: Arizona, Colorado, Connecticut, Delaware, District of Columbia, Illinois, Indiana, Iowa, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Dakota, Utah, and Virginia.

Host: From material examined *D. caudata* has been reared from *Alnus* sp. in Colorado and from *Betula* sp. in Virginia. It has been collected on *Alnus incana* (L.), *Betula occidentalis* Hooker, *Prunus virginiana* L., and on peach.

Flight period: Collected from January 22 to November.

Comparisons: Although *D. caudata* is often confused with *D. divaricata* it can be distinguished as indicated in the key.

14. *Dicerca aeneovaria* Waterhouse

Dicerca aeneovaria Waterhouse 1882: 12, Pl. 1, Fig. 14; 1889: 174; Kerremans 1892: 86; Obenberger 1930: 325; Blackwelder 1944: 312.

Diagnosis: Robust, cupro-aenous above and below; pronotal disk evenly convex, or with faint indication of two longitudinal raised areas; lateral margin of pronotum widest at middle; elytral apices bidentate; anterior margin of prosternum with two teeth, neither margin nor teeth are reflexed; pro- and mesofemora and tibiae stout and relatively short; mesotibia of male with dilation; apex of last visible abdominal sternite of male shallowly emarginate, hind angles but weakly produced, apex of last abdominal sternite of female entire with slight indentation.

Male genitalia not seen.

Variation: Only the female type and one male were seen by Dr. Barr in the BMNH and aside from the sexual differences mentioned above they were quite similar. The female type is 24.7 mm in length while

the male is 25.5 mm in length. He states that the type is even more robust than the figure in the *Biologia Centrali Americana* indicates.

Type locality: The female type is from Mexico City, collected by Höge and the male specimen is labelled "jalapa, Vera Cruz. Höge" (BMNH). The latter is mentioned in Waterhouse (1889) p. 174.

Host: Unknown.

Comparisons: According to notes by W. F. Barr this species is robust like *D. inconspicua* but is more mottled in appearance. It differs from both *D. inconspicua* and *D. propinqua*, in which the mesotibia of the male is simple, in having a lobe-like dilation on the mesotibia of the male and in having the front and middle legs much more robust. From *D. propinqua* it also differs in having the widest point of the lateral margin of the pronotum at the middle instead of at the base.

15. *Dicerca inconspicua* Waterhouse

Dicerca inconspicua Waterhouse 1882: 11, 12; Kerremans 1892: 87; Duges, 1897, *La Naturaleza*, Ser. 2, 2: 6.

Poecilonota inconspicua Obenberger 1930: 343; Blackwelder 1944: 312.

Diagnosis: Robust; cupreo-aeneous above and below; pronotal disk evenly convex with midline flattened area between two, faintly indicated, longitudinal raised areas; lateral margin of pronotum slightly expanded to widest at middle; elytral apices moderately bidentate; anterior margin of prosternum with two teeth which are directed somewhat ventrally; mesotibia of male simple; apex of last visible abdominal sternite of male emarginate, hind angles acutely produced, apex of last abdominal sternite of female entire.

Male genitalia not seen.

Variation: Of the four specimens of this species in the British Museum Barr states three are males which vary from 18.0 mm in the lectotype to 21.2 mm long; the female is 22.0 mm long.

Type locality: The male lectotype is labelled "Mexico Flohr" "110" "Syntype" "BCA III *Dicerca inconspicua* W." (BMNH).

Geographical distribution: All three males are merely labelled "Mexico" and the female is from "Amula, Guerrero, 6000 ft., Aug., H. H. Smith".

Host: Unknown.

Comparisons: Most closely similar to *D. aeneovaria* under which the differences are discussed. From *D. propinqua*, *D. inconspicua* differs in being much more robust, in having the widest point of the lateral margin of the pronotum at the middle instead of at the base, the elytral hair arranged in smaller more irregular patches and in having the hind angles of the last abdominal sternite of the male more acutely produced.

16. *Dicerca propinqua* Waterhouse

Dicerca propinqua Waterhouse 1882: 12, 13, Pl. 1, Fig. 12; Kerremans 1892: 88; Obenberger 1930: 335; Blackwelder 1944: 312.

Diagnosis: Slender; cupreous-aeneous above and below; pronotal disk convex with faint indications of two longitudinal raised areas, lateral margin of pronotum sinuate with widest point at base; elytral apices strongly bidentate; anterior margin of prosternum with two teeth which, along with area between them, are somewhat reflexed ventrally; mesotibia of male simple; apex of last visible abdominal sternite shallowly emarginate, hind angles but weakly produced.

Male genitalia not studied.

Length 20.0 mm.

The Diagnosis is from observations of the unique male type made by Dr. W. F. Barr. The second specimen (a variety?) of *D. propinqua* mentioned by Waterhouse (1882) could not be found in the British Museum.

Female: Not known.

Type locality: Mexico, Juquila (a small town 120 km. south-southwest of Oaxaca, according to Selander & Vaurie, 1962), type (BMNH).

Host: Unknown.

Comparisons: Similar to *D. aeneovaria* and *D. inconspicua* with differences being mentioned under each of those species.

17. *Dicerca pugionata* (Germar) (Figs. 12, 39, 55, 78)

Buprestis pugionata Germar, 1824, Ins. Spec. Nov., p. 37.

Stenuris pugionata Melsheimer 1853: 63.

Dicerca pugionata Mannerheim, 1837, Bull. Soc. Nat. Moscow, 7: 56: LeConte, 1860 (1859): 196; Horn, 1868, Trans. Amer. Ent. Soc., 2: 124; Crotch 1873: 85; Lugger, 1884, Psyche, 55: 203; Blanchard 1889: 30; Chittenden 1889: 219;

Harrington 1890: 159; Kerremans 1892: 88; Hamilton 1895: 364; Ulke 1902: 21; Kerremans 1903: 131; Felt 1906: 750; Casey 1909: 138; J. B. Smith 1910 (1909): 292; Blatchley 1910: 781; Manee, 1913, Ent. News, 24: 167; Frost 1920: 25; Britton 1920: 243; Knull 1920: 5; Leng 1920: 180; Knull 1922: 80; Champlain & Knull, 1925, Can. Ent., 57: 113; Knull 1925: 2, 13; Chamberlin 1926: 193; Leonard 1928: 356; Obenberger 1930: 335; Champlain & Knull, 1932, Ent. News, 43: 257; Brimley 1938: 171; Craighead 1950: 195; Franklin & Lund 1956: 25.

Diagnosis: Small, elongate, strongly convex; cupreous, more vividly so toward elytral apices and on ventral surface; elongate black raised areas of elytra moderately distinct; elytral apices bidentate, usually prolonged; mesotibia of male simple; last abdominal sternite of female tridentate.

Male: Head flattened, rugosely punctate, rugae mainly longitudinal; hair short and sparse; clypeal angles not prominent; antennae short, not reaching middle of pronotum, outer joints short and broad (Fig. 39).

Pronotum with lateral margins broadest at base, arcuately converging to anterior angles; disk convex with punctate median channel more impressed anteriorly and posteriorly, disk with two pairs of longitudinal smooth raised areas and smaller raised areas near lateral margin; punctures coarse, becoming larger and more rugose laterally; short white hair inconspicuous.

Elytra slightly wider than pronotum at base, lateral margins subparallel to behind middle, then converging to prolonged elytral apices, apices bidentate; disk with striae evident medially, confused laterally, intervals with many smooth black raised areas, intervals carinate toward apices.

Venter coarsely punctured, especially laterally; thoracic sternites with longitudinal smooth, largely impunctate areas bordering punctate, hairy, median concave channel, concavity extending from prosternum to anterior part of first abdominal sternite; mesotibia simple; last abdominal sternite emarginate, emargination with short rectangular projection.

Male genitalia (Fig. 55) with apices of parameres converging at nearly right angles.

Length 11.0 mm; width 3.7 mm.

Redescribed from a male in the author's collection from New York, West Point.

Female: Differs from male in having ventral midline less concave and less hairy; apex of last abdominal sternite tridentate.

Variation: In some specimens the color is almost black. The

males vary from 11.0 to 14.8 mm long, and from 3.7 to 4.9 mm wide; the females from 11.3 to 15.0 mm long, and from 3.9 to 5.3 mm wide.

Type locality: Kentucky, location of type unknown.

Geographical distribution (Fig. 12): From 135 specimens examined. Canada: Ontario. United States: Connecticut, Delaware, District of Columbia, Georgia, Maryland, Massachusetts, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, and Virginia.

Host: From material examined *D. pugionata* has been collected on *Alnus incana* (L.). It has been reared from and sometimes kills "witch hazel", *Hamamelis virginiana* L. according to Knull (1920, 1925) who states that this species, unlike other species of the genus, prefers to attack perfectly healthy plants. It also works in living "ninebark", *Physocarpus opulifolius* (L.) Maxim. According to Knull, (1925) and Craighead (1950).

Flight period: Collected from January 5 to September 30.

Comparisons: This distinctive little species is similar to *D. caudata* in general shape but the bidentate elytral tips of *D. pugionata* will easily distinguish it. The prolonged elytral apices, small size, and bright cupreous color will help to separate it from others with bidentate elytral tips.

18. *Dicerca lepida* LeConte (Figs. 13, 56, 79)

Buprestis pugionata Laporte & Gory (not Germar) 1837: 99.

Dicerca lepida LeConte 1857 a: 7; 1860 (1859): 198; E. Saunders 1871: 36; Crotch 1873: 85; LeConte 1873: 331; Kerremans 1892: 87; Stromberg 1894: 37; Hamilton 1895: 364; Ulke 1902: 21; Kerremans 1903: 132; Casey 1909: 138; Knull 1920: 5; Leng 1920: 180; Knull 1922: 80; 1925: 13, Pl. 3, Fig. 3; Chamberlin 1926: 186; Obenberger 1930: 330; Franklin & Lund 1956: 25.

Diagnosis: Elongate, moderately convex; brassy to cupreous above and below; smooth black raised areas conspicuous; elytral apices bidentate, weakly prolonged; mesotibia of male simple; last abdominal sternite of female tridentate.

Male: Head flattened, slightly impressed, rugosely punctured; two longitudinal raised areas on vertex, an irregular transverse raised area on front with a smaller one below it; punctured areas with short white hairs; clypeal angles prominent; antennae short, not reaching middle of pronotum at sides, outer joints broadly triangular.

Pronotum with lateral margins subparallel at base, slightly expanded at middle then arcuately converging to anterior margin; disk with three pairs

of longitudinal smooth raised areas, median pair broad, separated by punctate midline impression, middle pair narrowed or interrupted by depression behind middle, pair near lateral margin irregular and interrupted; punctured areas more coarse laterally, clothed with short, semirecumbent white hair.

Elytra slightly wider than pronotum at base, lateral margins subparallel to middle then converging to weakly prolonged bidentate apices; striae weakly indicated medially, confused laterally; smooth raised areas predominant on disk toward suture, punctured areas predominant laterally and with short semirecumbent white hair.

Venter coarsely punctured laterally, with smooth, sparsely punctured areas bordering punctate, hairy, median concave channel, concavity extending from prosternum to anterior part of first abdominal sternite; mesotibia simple; last abdominal sternite emarginate, with short rectangular projection in emargination.

Male genitalia (Fig. 56) with apices of parameres rounded.

Length 16.0 mm; width 5.7 mm.

Redescribed from a male homotype in the author's collection from Maryland, Plummer's Island.

Female: Differs from male in having ventral midline less concave and less hairy; apex of last abdominal sternite tridentate.

Variation: The color varies from aeneous to cupreous. The males vary from 13.5 to 17.5 mm long and from 4.5 to 5.8 mm wide; the females from 14.1 to 16.5 mm long and from 4.7 to 5.7 mm wide.

Type locality: Pennsylvania, type (MCZ, No. 2656).

Geographical distribution: (Fig. 13): From 34 specimens examined. United States: Alabama, Arkansas, Indiana, Iowa, Kansas, Maryland, New Mexico, New York, Pennsylvania, and Texas.

Host: From material examined *D. lepida* has been collected on *Quercus* sp., and under bark of dead *Ulmus* sp. Knull (1920) records rearing it from *Ostrya virginiana* K. Koch, and (1922) from dead *Crataegus coccinea* L.

Flight period: Collected from March 27 to August 15.

Comparisons: In general appearance *D. lepida* closely resembles *D. asperata* and *D. spreta* but the latter two have the transverse callous between the eyes and other body sculpture more strongly indicated. The male genitalia are distinctive and the mesotibia of the male *D. lepida* is simple but toothed in *D. spreta*.

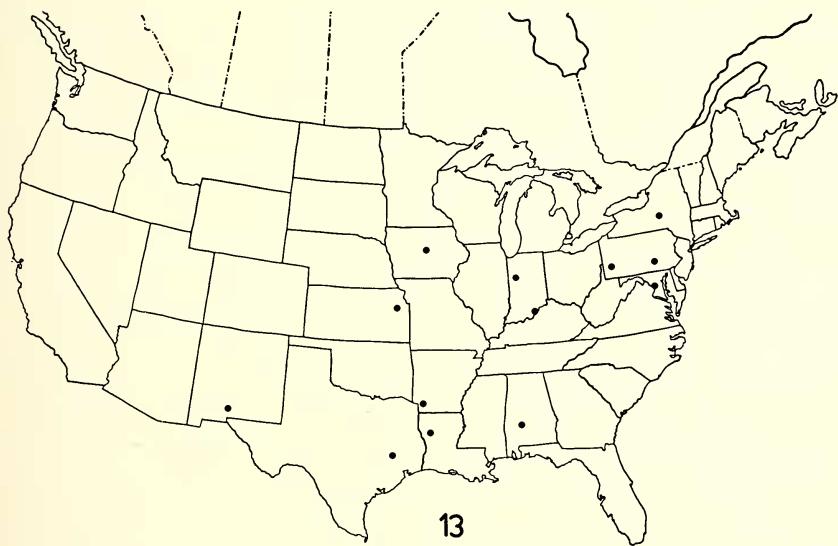
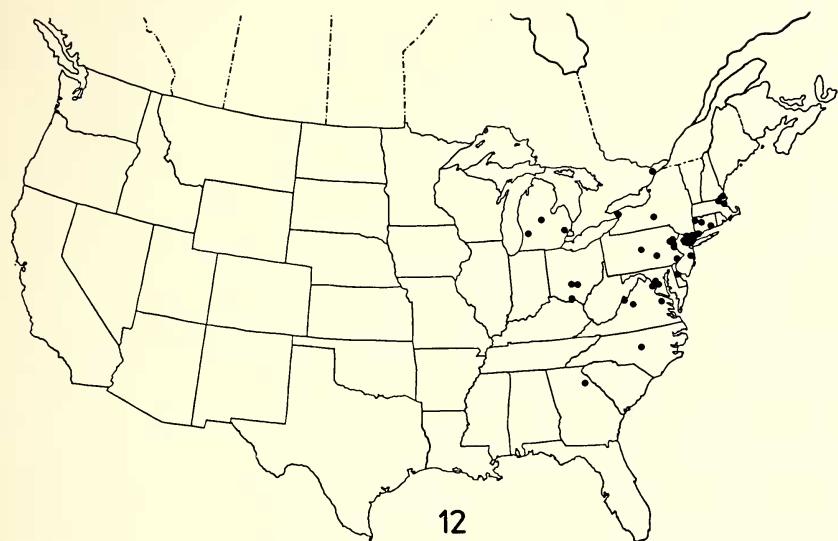


Fig. 12—13: Known geographic ranges of Fig. 12, *Dicerca pugionata* (Germar) and Fig. 13, *D. lepida* LeConte.

19. *Dicerca asperata* (Laporte & Gory) (Figs. 14, 57, 81)

Buprestis asperata Laporte & Gory 1837: 105, Pl. 27, Fig. 143.

Dicerca molitor Melsheimer 1845: 144.

Stenurus molitor Melsheimer 1853: 62.

Stenurus asperata Melsheimer 1853: 63.

Dicerca asperata LeConte 1857 a: 7; Pettit 1870: 102; Crotch 1873: 85; Hubbard & Schwarz 1878: 655; Bowditch 1882: 27; Hamilton 1888: 65; Blanchard 1889: 30; Chittenden 1889: 219; Packard 1890: 221, 328; Kerremans 1892: 86; Ulke 1902: 21; Felt 1906: 701; Blatchley 1910: 782; Wickham 1911: 23; Gibson, 1917, 47. Rep. Ent. Soc. Ont., p. 149; Schaeffer, 1919, Bull. Brookl. Ent. Soc., 14: 147.

Dicerca spreta LeConte (Not Laporte & Gory) 1860 (1859): 198; E. Saunders 1871: 36; Leonard 1928: 357.

Dicerca scobina Kerremans (not Chevrolat) 1892: 89; Casey 1909: 164; Obenberger 1930: 337.

Dicerca americana J. B. Smith (not Herbst) 1910 (1909): 292; Knull 1920: 5; Britton 1920: 243; Knull 1922: 80; 1925: 14; Chamberlin 1926: 180; Leng & Mutchler 1933: 29; Brimley 1938: 171; Franklin & Lund 1956: 25.

Diagnosis: Elongate, moderately convex; virido-aeneous to blackish above, punctate areas obscured by white pulverescence in unrubbed specimens, cupreous-bronze below; smooth black raised areas distinct above; elytral apices bidentate, barely prolonged; mesotibia of male simple; last abdominal sternite of female tridentate.

Male: Head flattened, coarsely, rugosely punctured and clothed with semirecumbent white hair; transverse raised area between eyes variously connected to two longitudinal areas on vertex; antennae reaching middle of pronotal side.

Pronotum with lateral margins subparallel from base to widest point before middle then converging to anterior margin; disk moderately convex; depressions on each side back of middle, longitudinal smooth raised areas bordering median punctate area, another halfway to lateral margin interrupted by depression and irregular raised areas near lateral margin; coarsely, rugosely punctured laterally, punctures smaller medially, punctate area with short semirecumbent white hair.

Elytra wider than pronotum at base, lateral margins sinuately subparallel to behind middle, then converging to feebly prolonged bidentate apices; disk with punctured striae faintly evident medially, confused laterally, smooth black raised areas strongly evident, punctured areas more extensive laterally with short semirecumbent white hair.

Venter coarsely, rugosely punctured laterally, punctures becoming smaller and sparse medially; prosternal process with median longitudinal concavity weak and with sparse punctures and hairs, concavity feeble on meso- and metasternites, more evident on anterior part of first abdominal sternite; mesotibia simple; last abdominal sternite emarginate with short broad rectangular projection in emargination.

Male genitalia (Fig. 57) with lateral margins of parameres reflexed dorsally.

Length 14.5 mm; width 5.4 mm.

Redescribed from a male in the author's collection from New York, West Point, that compares favorably with a female homotype determined by Mr. Descarpentries of Paris.

F e m a l e : Differs from male in being slightly more robust; apex of last abdominal sternite tridentate.

V a r i a t i o n : Freshly caught specimens generally have a moderate amount of pulverescence on the punctured areas with hair but most museum specimens lack this. The general color of aeneous with a definite greenish cast is sometimes darker. The males vary from 12.3 to 17.5 mm long and from 4.0 to 6.0 mm wide; the females from 12.3 to 18.5 mm long and from 4.5 to 6.5 mm wide.

T y p e l o c a l i t y : Of *asperata*, Boreal America, type (MHNTP); of *molitor*, Pennsylvania, type could not be located in the MCZ.

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 14): From 130 specimens examined. United States: Alabama, Connecticut, Georgia, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Texas, Virginia, and West Virginia.

H o s t : From material examined, *D. asperata* has been reared from *Quercus* sp. Also it has been collected on *Taxodium distichum* Richard (Probably not a host).

F l i g h t p e r i o d : Collected from January 12 to December 15 (winter dates probably for hibernating specimens).

C o m p a r i s o n s : Most often confused with *D. spreta* but *D. asperata* has a generally less robust form, the general body color is virido-aeneous, the mesotibia of the male is simple, and the front of the head is flat; while in *D. spreta* the general body color is brassy-cupreous, the mesotibia of the male is toothed, and the front of the head is concave. It can be separated from *D. lepida* as mentioned under that species.

20. *Dicerca spreta* (Gory) (Figs. 15, 58, 80)

Buprestis spreta Gory 1841: 108, Pl. 19, Fig. 105; LeConte 1857 a: 8.

Dicerca impressifrons Melsheimer 1845: 144; LeConte 1857 a: 8 (= *spreta*).

Stenurus americana Melsheimer 1853: 62.

Stenurus impressifrons Melsheimer 1853: 62.

Dicerca asperata LeConte (not Laporte & Gory) 1860 (1859): 199; E. Saunders 1871: 36.

Dicerca spreta Pettit 1870: 102; Crotch 1873: 85; Kerremans 1892: 89; Ulke 1902: 21; Blatchley 1910: 782; Leng 1920: 180; Chamberlin 1926: 196; Brimley 1938: 171; Kirk, 1969, S. Car. Exp. Sta., Tech. Bull. 1033, p. 45; 1970, S. Car. Exp. Sta., Tech. Bull. 1038, p. 47.

Dicerca americana E. Saunders (not Herbst) 1871: 36; Kerremans 1892: 86; Casey 1909: 163; Obenberger 1930: 325.

Dicerca scobina J. B. Smith (not Chevrolat) 1910 (1909): 292; Knull 1920: 5; 1922: 80; 1925: 14; Craighead 1950: 195; Franklin & Lund 1956: 25.

Diagnosis: Elongate, moderately convex; brassy to cupreous-brassy above with white pulverescence obscuring punctured areas in unrubbed specimens, below cupreous to brassy with greenish tint on mouth-parts, legs and median channel; black raised areas of elytra prominent but not extensive; elytral apices bidentate, barely prolonged; mesotibia of male with strong tooth; last abdominal sternite of female tridentate.

Male: Head distinctly depressed in front, coarsely, rugosely punctured, clothed with fairly dense white semierect hair laterally, less dense and semirecumbent medially; transverse ridge between eyes, two longitudinal raised areas on vertex; antennae reaching middle of pronotal side.

Pronotum with lateral margins widest at base, subparallel to before middle then converging to narrowest at anterior margin; disk similar to *D. asperata* but median channel more depressed at base than in that species and with larger smooth area at middle of channel.

Elytra similar to *D. asperata* but punctate striae more evident.

Venter coarsely punctured laterally, with smooth sparsely punctured areas bordering densely punctured and hairy median concave channel, concavity extending from prosternum to anterior part of first abdominal sternite; mesotibia with strong internal tooth; last abdominal sternite emarginate, with very slight rectangular projection in emargination.

Male genitalia (Fig. 58) with lateral margins of parameres gradually rounded to apices.

Length 17.0 mm; width 6.2 mm.

Redescribed from a male in the author's collection from Alabama, Spring Hill.

F e m a l e : Differs from male in having ventral midline less concave and less hairy; mesotibia simple; last abdominal sternite tridentate.

V a r i a t i o n : Fresh specimens have the punctured areas densely covered by a white pulverescence (Fig. 80) which is easily removed revealing the brassy-cupreous body color that sometimes is much darkened. The males vary from 13.7 to 18.6 mm long and from 4.7 to 6.5 mm wide; the females from 15.2 to 20.0 mm long and from 5.3 to 7.2 mm wide.

T y p e l o c a l i t y : Of *spreta*, Boreal America, location of type unknown; of *impressifrons*, Pennsylvania, type couldn't be located in the MCZ.

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 15): From 88 specimens examined. United States: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Pennsylvania, South Carolina and Virginia.

H o s t : Knoll (1920) recorded rearing it from sour gum, *Nyssa sylvatica* Marshall.

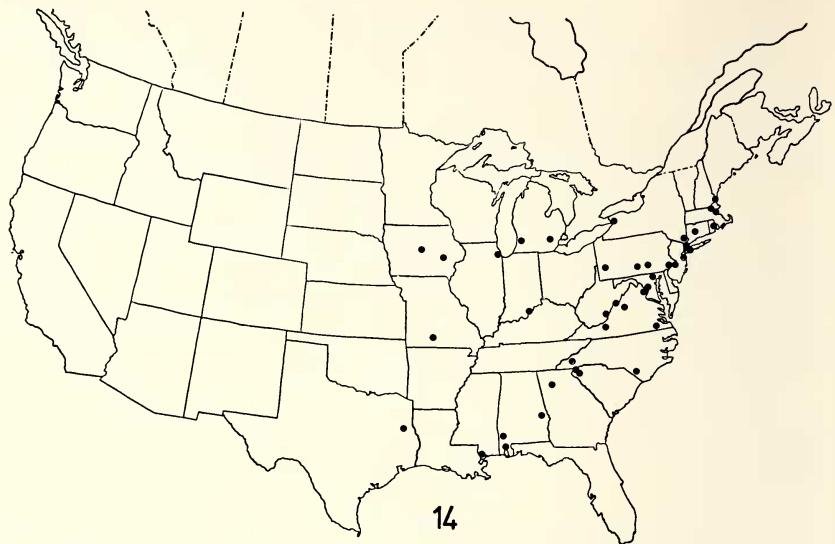
F l i g h t p e r i o d : Collected from January 15 to December 23 (some of these dates probably from hibernating specimens).

C o m p a r i s o n s : Sometimes *D. spreta* is confused with *D. asperata* and *D. lepida* and the differences are discussed under each of those species. This species has been confused in the literature with *Buprestis americana* Herbst described from "America". However, Théry (1926) indicates *americana* is a species of the genus *Ectinogonia* from Chile and Obenberger (1926) placed several species, including *americana*, in his genus *Achardella*.

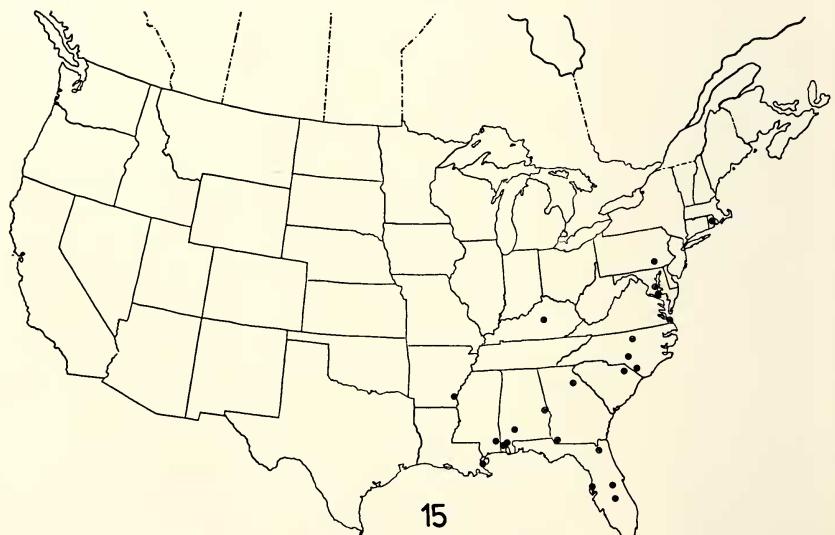
21. *Dicerca juncea* Knoll (Figs. 16, 59, 84)

Dicerca juncea Knoll 1958: 153, Fig. 1.

D i a g n o s i s : Narrow, strongly convex; cupreous above and below; sides of pronotum almost straight and converging from base, median channel feebly indicated from base to apex; elytral apices strongly bidentate; mesotibia of both sexes simple; hind coxal plates notched, with tooth on outer side of notch; last visible abdominal sternite rectangularly emarginate in male, tridentate in female.



14



15

Fig. 14—15: Known geographic ranges of Fig. 14, *Dicerca asperata* (Laporte & Gory) and Fig. 15, *D. spreta* (Gory).

This species was well described by Knull (1958).

Male genitalia (Fig. 59).

Variation: The color varies from aeneo-cupreous to dark cupreous. The males vary from 11.1 to 15.5 mm long and from 3.7 to 5.1 mm wide; the females from 11.3 to 18.6 mm long and from 3.5 to 6.3 mm wide.

Type locality: Florida, Navarre, type (J. N. Knull collection, Columbus, Ohio).

Geographical distribution (Fig. 16): From the type series and from 52 specimens examined. United States: Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina.

Host: Unknown but from material examined *D. juncea* has been collected on *Acer* sp. and *Prunus persica* Batsch. in Florida and under bark of *Quercus* sp. in Mississippi.

Flight period: Collected from February 12 to December 16.

Comparisons: Most similar to *D. obscura* but differs in being more cupreous, more slender and convex, pronotum with the lateral margins straight compared to arcuate in *D. obscura*, and the male genitalia (Fig. 59) with parameres more arcuate than in *D. obscura*. Differs from *D. lurida* in the shape of the pronotum, and shape of the hind coxal plate as indicated in the key. The male genitalia are different also.

22. *Dicerca obscura* (Fabricius) (Figs. 17, 25, 60, 85)

Buprestis obscura Fabricius, 1781, Spec. Ins., p. 274; 1787, Mant. Ins., 1: 176; Gmelin, 1788, in Linnaeus, Syst. Nat., Edit. 13, I, 4, p. 1927; Fabricius, 1792, Ent. Syst. I, 2, p. 190; 1801, Syst. Eleuth., 2: 190; Herbst, 1801, Käfer, 9: 96, Pl. 143, Fig. 5; Illiger, 1805, Mag. Ins., 4: 86, No. 25; Schönherr 1817: 219; Say, 1830, Descr. N. Amer. Ins. New Harmony, p. 61; 1836, Trans. Amer. Phil. Soc., 6: 158; Laporte & Gory 1837: 103, Pl. 26, Fig. 141; Sturm, 1843, Cat. Coleopt., p. 59; White 1848: 20; LeConte 1857 a: 7.

Buprestis baltimorensis Herbst, 1801, Käfer, 9: 99, Pl. 148, Fig. 7; Schönherr 1817: 219; LeConte 1857 a: 7.

Buprestis consimilis Laporte & Gory 1837: 104, Pl. 27, Fig. 142.

Stenuris obscura Melsheimer 1853: 62.

Stenuris (baltimoriensis, misspelled) Melsheimer 1853: 62.

Stenuris consimilis Melsheimer 1853: 63.

Poecilonota baltimorensis Lacordaire 1857: 36.

Dicerca obscura LeConte 1860 (1859): 196; E. Saunders 1871: 36; Crotch 1873: 85; Provancher 1877: 349; Glover 1878: Pl. 11, Fig. 11; Schwarz, 1878, Proc.

Amer. Phil. Soc., 17: 451; Hubbard & Schwarz 1878: 655; Zesch & Reinecke 1880: vii; LeConte 1883: 591; Townsend, 1884, *Psyche*, 4: 221; Hansen, 1886, *Can. Ent.*, 18: 78; Hamilton 1888: 65; Packard 1890: 442; Townsend, 1892, *Ins. Life*, 5: 39; Kerremans 1892: 88; Hopkins 1893: 181; Scott, 1901, *Bur. Ent. Bull.* 31, p. 31; Ulke 1902: 21; Kerremans 1903: 131; Hopkins, 1904, *U. S. Dep. Agr. Div. Ent. Bull.* 48, p. 38; Felt 1906: 427, 442, 499, 500; Casey 1909: 131; J. B. Smith 1910: 292; Blatchley 1910: 782; Wickham 1911: 23; Watson, 1911, *Nat. Res. N. Mex.*, p. 99; Beal, 1912, *U. S. Dep. Agr., Bull. Biol. Surv.* 44, p. 16; Manee, 1913, *Ent. News*, 24: 167; Kwiat, 1915, *Ent. News*, 26: 237; Robinson, 1915, *Jour. N. Y. Ent. Soc.*, 23: 151; Chagnon 1917: 217; Burke, 1917b, *Jour. Econ. Ent.*, 10: 326; Dozier, 1918, *Ent. News*, 29: 331; Knull 1920: 5; Britton 1920: 243; Leng 1920: 180; Kalmbach & Gabrielson, 1921, *U. S. Dep. Agr., Bull.* 868, p. 61; Knull 1922: 80; Chamberlin 1924a: 185; Felt, 1924, *Man. Tree & Shrub Ins.*, MacMillan Co., p. 183; Knull 1925: 12, Pl. 1, Fig. 28; Chamberlin 1926: 189; Ryerson, 1927, *Calif. Agr. Exp. Sta., Bull.* 416, p. 63, 20 Figs.; 1927, *Rev. Appl. Ent. A*, 15: 541; Leonard 1928: 356; Obenberger 1930: 332; Brimley 1938: 171; Blackwelder 1939: 43; Kajihiro & Millspaugh 1950: 195; Franklin & Lund 1956: 25; Kirk, 1969, *S. Car. Exp. Sta., Tech. Bull.* 1033, p. 45; 1970, *S. Car. Exp. Sta., Tech. Bull.* 1038, p. 47.

Dicerca soror LeConte 1860 (1859): 197; E. Saunders 1871: 36; Crotch 1873: 85; Kerremans 1892: 89; Obenberger 1930: 338.

Dicerca baltimorensis E. Saunders 1871: 36; Crotch 1873: 85; LeConte 1873: 331; Kerremans 1892: 86 (*baltimoriensis*, misspelled).

Dicerca consimilis LeConte 1873: 331; Kerremans 1892: 86.

D i a g n o s i s : Elongate, moderately convex; brassy to cupreous above and below; pronotal margins converging from base; small black raised areas on elytra inconspicuous; elytral apices bidentate; mesotibia of male simple; hind coxal plate notched with tooth on outer side of notch (Fig. (25)); last abdominal sternite of female tridentate.

M a l e : Head flattened, coarsely, rugosely punctured with short white hairs; two longitudinal smooth areas on vertex, several irregular ones on front; antennae not reaching middle of side of pronotum.

Pronotum with lateral margins widest at base, arcuately converging to anterior margin; disk evenly convex with two pair of longitudinal smooth areas extending from base to anterior margin and irregular ones near lateral margin; median punctate channel mainly indicated anteriorly and posteriorly, punctures larger laterally.

Elytra barely wider at base than pronotum; lateral margins sinuately subparallel to widest point just behind middle, then converging to barely produced bidentate elytral apices; disk with punctured striae evident toward suture, becoming confused laterally, short semirecumbent white hair of punc-

tured areas inconspicuous; smooth black raised areas numerous but not prominent.

Venter coarsely punctured laterally, with smooth sparsely punctured areas bordering densely but finely punctured and hairy median concave channel, concavity extending from prosternum to anterior part of first abdominal sternite; mesotibia simple; metacoxal plate with distinct notch on posterior margin with tooth on outer side of notch (Fig. 25); last abdominal sternite emarginate, with short rectangular projection in emargination.

Male genitalia (Fig. 60) with parameres strongly rounded apically.

Length 18.0 mm; width 6.0 mm.

Redescribed from amale homotype in the writer's collection from Virginia, Nelson County, determined by S. G. Larsson, Copenhagen, Denmark.

F e m a l e : Differs from male in having ventral midline less concave and less hairy; apex of last abdominal sternite tridentate.

V a r i a t i o n : The aeneo-cupreous color is much darker in some specimens. The males vary from 14.1 to 18.8 mm long and from 4.8 to 6.4 mm wide; the females from 13.0 to 20.0 mm long and from 4.8 to 7.0 mm wide.

T y p e l o c a l i t y : Of *obscura*, "Boreal America", type (Universitetets Zoologiske Museum, Copenhagen, Denmark); of *baltimorensis*, Maryland, Baltimore, location of type unknown; of *consimilis*, "Boreal America", type (MHNTP); of *soror*, Pennsylvania, type (MCZ, No. 2655).

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 17): From 333 specimens examined. United States: Alabama, Arkansas, District of Columbia, Florida, Georgia, Indiana, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, and Virginia.

H o s t : From material examined *D. obscura* has been reared from *Diospyros virginiana* L. and from *Rhus* sp. Knull (1920) records rearing it from *Rhus typhina* L. It has also been collected on *Quercus* sp., and on *Carya* sp.

F l i g h t p e r i o d : Collected throughout the year (hibernates in winter).

C o m p a r i s o n s : Looks much like *D. juncea* under which it is compared. From *D. lurida* it differs in the pronotal shape and shape of the hind coxal plate as indicated in the key. The male genitalia are different also.

23. *Dicerca lurida* (Fabricius) (Figs. 18, 23, 26, 61, 86)

Buprestis lurida Fabricius, 1775, Syst. Ent., p. 217; 1781, Spec. Ins., 1: 274; 1787, Mant. Ins., 1: 16; Gmelin, 1788, in Linnaeus, Syst. Nat., Edit. 13, I, 4, p. 1927; Oliver, 1790, Ent. II, Gen. 32, p. 20, Pl. 8, Fig. 23; Fabricius, 1792, Ent. Syst. I, 2, p. 190; 1801, Syst. Eleuth., 2: 190; Herbst, 1801, Käfer, 9: 95, Pl. 143, Fig. 4; Schönherr 1817: 219; Say, 1830, Descr. N. Amer. Ins., New Harmony, p. 60; 1836, Trans. Amer. Phil. Soc., 6: 157; Laporte & Gory 1837: 105, Pl. 27, Fig. 144; Sturm, 1843, Cat. Coleopt., p. 59; White 1848: 20; LeConte 1857 a: 7; Thomson, 1857, Arch. Ent., 1: 377.

Buprestis cuprea Melsheimer 1806: 46; White 1848: 20 (nomen nudum).

Buprestis maculata Melsheimer 1806: 46; White 1848: 20 (nomen nudum).

Buprestis corrosa Dejean 1837: 87; White 1848: 20 (nomen nudum).

Buprestis pruinosa Gory 1841: 109, Pl. 19, Fig. 106; LeConte 1857 a: 8.

Dicerca indistincta Melsheimer 1845: 143; LeConte 1860 (1859): 197.

Stenurus lurida Melsheimer 1853: 62.

Stenurus indistincta Melsheimer 1853: 62.

Buprestis indistincta Lacordaire 1857: 36.

Dicerca lurida LeConte 1860 (1859): 197; Harris, 1862, Ins. Inj. Veg. (3rd Edit.), p. 48; Glover, 1869, U. S. Dep. Agr. Rep. (1868), p. 91; Pettit 1870: 102; E. Saunders 1871: 36; Clementi, 1872, Can. Ent., 4: 37; Crotch 1873: 85; LeConte 1873: 331; Austin, 1874, Proc. Boston Soc. Nat. Hist., 16: 269; LeBaron, 1874, 4. Ill. Rep. No. X & Benef. Ins., p. 95; Thomas, 1876, 6. Rep. Ill. Ent., p. 113; Osburn, 1882, Iowa St. Leader, p. 3; Bowditch 1882: 27; LeConte 1883: 590; Harrington, 1884, 14. Rep. Ent. Soc. Ont., p. 44; Hamilton 1888: 65; Blandhard 1889: 30; Chittenden 1889: 220; Packard 1890: 290; Kerremans 1892: 87; Hopkins 1893: 181; Hamilton 1895: 364; Wolcott, 1896, Ent. News, 7: 236; Bowditch, 1896, Psyche, 7, Suppl. II, p. 6; Ulke 1902: 21; Felt 1906: 427, 442, 504; Casey 1909: 136; J. B. Smith 1910 (1909): 292; Blatchley 1910: 782; Wickham 1911: 23; Engelhardt, 1912, Jour. N. Y. Ent. Soc., 20: 221; Adams, 1915, Bull. Ill. St. Lab. Nat. Hist., 11: 147; Robinson, 1915, Jour. N. Y. Ent. Soc., 23: 151; Johnson, 1915, Ent. News, 26: 312; Nicolay 1919: 19; Knull 1920: 5; Britton 1920: 243; Frost 1920: 28; Leng 1920: 180; Kalmbach, 1921, U. S. Dep. Agr. Bull. 868, p. 61; Knull 1922: 80; Chamberlin 1924 a: 185; Rhodes, 1924, N. Y. St. Coll. For., Tech. Bull. 17, p. 56; Blackman & Stage, 1924, N. Y. St. Coll. For. (Univ. Syracuse), Tech. Pub. 17, 24: 14, 16, 17, 19—25, 27, 29—34, 56—60, 252, 256, Pl. 6, Fig. 23, Pl. 8, Fig. 30; Knull 1925: 12, Pl. 1, Fig. 24; Chamberlin 1926: 187; Leonard 1928: 356; Chamberlin, 1928, Pan-Pac. Ent., 5: 93; 1929: 114; Knull 1930: 83; Obenberger 1930: 331; Chamberlin, 1932, Jour. Econ. Ent., 25: 833; Brimley 1938: 171; Kajihiro & Millsbaugh 1950: 542; Craighead 1950: 195; Franklin & Lund 1956: 25; Kirk, 1970, S. Car. Exp. Sta., Tech. Bull. 1038, p. 47; Barr 1971: 58.

Dicerca pruinosa LeConte 1873: 331. New synonymy.

Dicerca cuprea Kerremans 1892: 86.

Dicerca corrosa Kerremans 1892: 86.

Dicerca maculata Kerremans 1892: 87.

Dicerca indurata Casey 1909: 131; Obenberger 1930: 330. **New synonymy.**

Dicerca truncata Casey 1909: 132; Chamberlin 1926: 188; Obenberger 1930: 339.

Dicerca gracilis Casey 1909: 136; Chamberlin 1926: 188; Obenberger 1930: 330.

Dicerca porcatula Casey 1909: 133; Obenberger 1930: 334. **New synonymy.**

Dicerca innocua Casey 1909: 134; Chamberlin 1926: 188; Obenberger 1930: 330.

Dicerca sagax Casey 1909: 134; Obenberger 1930: 337. **New synonymy.**

Dicerca floridæ Casey 1909: 134; Obenberger 1930: 330. **New synonymy.**

Dicerca soror (not LeConte) 1909: 134.

Dicerca regularis Casey (subsp. of *soror* Csy.) 1909: 134, 135; Obenberger 1930: 338. **New synonymy.**

Dicerca levettei Casey 1909: 135; Chamberlin 1926: 188; Obenberger 1930: 330.

Dicerca gaudens Casey 1909: 135, 136; Chamberlin 1926: 188; Obenberger 1930: 330.

Dicerca seriata Casey 1909: 136; Chamberlin 1926: 188; Obenberger 1930: 337.

Dicerca erosa Casey 1909: 136, 137; Chamberlin 1926: 188; Obenberger 1930: 329.

D i a g n o s i s : Elongate, strongly convex; brassy to cupreous above and below; pronotal margins subparallel to beyond middle; small black raised areas of elytra inconspicuous; elytral apices short and bidentate (Fig. 23); mesotibia of male simple; hind coxal plate indistinctly notched, without tooth (Fig. 26); last abdominal sternite of female tridentate.

M a l e : Head flattened, coarsely, rugosely punctured, punctures with inconspicuous white hairs; irregular smooth callosities on front and vertex; antennae not quite reaching middle of side of pronotum.

Pronotum with lateral margins subparallel from base to before middle then converging to anterior margin; disk strongly and evenly convex, densely punctured, punctures larger laterally; faintly indicated longitudinal smooth areas in middle and half way to lateral margin, smaller callosities near lateral margin; midline channel feebly indicated anteriorly and posteriorly.

Elytra slightly wider at base than pronotum; lateral margins subparallel to middle then converging to bidentate apices (Fig. 23); disk with punctured striae evident medially, confused laterally, smooth raised areas of intervals more numerous medially, punctured areas more extensive laterally, short, semirecumbent white hairs inconspicuous.

Venter as in *D. obscura* except metacoxal plate without distinct notch and tooth along posterior margin (Fig. 26); last abdominal sternite emarginate.

Male genitalia (Fig. 61) with apices of parameres truncate.

Length 16.5 mm; width 5.5 mm.

Redescribed from a male in the author's collection from Illinois, Edgebrook, which compares favorably with homotypes determined by C. M. F. von Hayek and J. Balfour-Browne of the BMNH.

F e m a l e : Differs from male in having ventral midline less concave, less punctured and less hairy; apex of last abdominal sternite tridentate.

V a r i a t i o n : The color varies from aeneous to dark cupreous. The males vary from 12.0 to 18.1 mm long and from 4.2 to 6.0 mm wide; the females from 11.8 to 20.0 mm long and from 4.0 to 6.8 mm wide.

T y p e l o c a l i t y : Of *lurida*, America, type (BMNH); of *pruinosus*, Louisiana, New Orleans, type (MHNP); of *indistincta*, Pennsylvania, type could not be located in the MCZ; of *indurata*, Texas, type of this and those that follow (Casey collection, USNM); of *truncata*, Wisconsin: of *gracilis*, New Hampshire; of *porcatula*, Kansas, Wilson County; of *innocua*, Florida, Marion County; of *sagax*, Indiana; of *floridæ*; Florida; of *soror*, Pennsylvania; of *regularis*, New York, Buffalo; of *levettei*, Illinois; of *gaudens*, Illinois (southern); of *seriata*, Texas; and of *erosa*, Iowa.

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 18): From 908 specimens examined. Canada: Ontario, and Quebec. United States: Alabama, Arkansas, California, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin. (The California and Oregon records are possibly accidental introductions).

H o s t : From material examined *D. lurida* has been reared from *Salix* sp. in Texas, from *Carya* sp. in Virginia, Indiana and Pennsylvania. Knull (1920) records rearing it from *Carpinus caroliniana* Walter, *Alnus rugosa* (Du Roi) Spreng, and (1930) from *Tilia glabra* Ventenat. It has been collected on *Quercus alba* L., *Q. velutina* Lamark, and *Carya* sp.

F l i g h t p e r i o d : Collected throughout the year (hibernates in winter).

C o m p a r i s o n s : Most similar to *D. obscura* and *D. juncea* and the differences are discussed under those species.

24. **Dicerca mutica** LeConte (Figs. 16, 21, 40, 62, 83)

Dicerca mutica LeConte 1860 (1859): 196; E. Saunders 1871: 36; Crotch 1873: 85; Kerremans 1892: 88; 1903: 132; Casey 1909: 165; J. B. Smith 1910 (1909): 292; Nicolay 1919: 18; Leng 1920: 180; Chamberlin 1926: 189; Leonard 1928: 357; Obenberger 1930: 332; Van Dyke 1934: 91 (= *obscura*).

Dicerca strandtmani Knull, 1947, Ohio Jour. Sci., 47: 174, 175; Blackwelder & Blackwelder 1948: 20. **New synonymy.**

Diagnosis: Elongate, moderately convex; bronzy black to virido-aeneous above and below, more shining below; raised areas inconspicuous, elytral tips obliquely entire, sutural angle slightly produced; prosternum slightly convex; mesotibia of male simple; last abdominal sternite of female tridentate (Fig. 21).

Male: Head coarsely, rugosely punctured with irregular smooth areas; front flattened; vertex with faint median groove; eyes more broadly separated below than above; antennae (Fig. 40) not reaching beyond middle of pronotum at sides, third joint distinctly longer than second, serrate from fourth joint distalward.

Pronotum with lateral margins diverging slightly from base to widest point near middle then converging more strongly to narrowest at anterior angle; disk convex with transverse depressions along basal margin in front of scutellum and toward posterior angle, and with slight median longitudinal punctate depression, longitudinal smooth areas from base to anterior margin, one beside median punctate area and another half way to lateral margin; punctures more coarse and becoming rugous laterally.

Elytra convex, lateral margins subparallel from base to widest at middle, then converging to obliquely entire apices, sutural angle slightly produced; disk coarsely, densely punctured especially laterally, striae more evident toward suture, intervals slightly convex with irregular smooth areas separated by punctate areas.

Venter coarsely and densely punctured laterally, punctures smaller and sparse medially, clothed with white hair which is very long in median areas of sterna and on femora; prosternal process slightly convex, margined by row of punctures; slight concavity of other sterna extending onto base of first abdominal segment; last visible abdominal sternite distinctly emarginate with broad truncate tooth projecting from floor of emargination; mesotibiae unarmed.

Male genitalia (Fig. 62).

Length 15.7 mm; width 5.6 mm.

Redescribed from the male holotype from New York, Brooklyn (MCZ).

F e m a l e : Differs from male by being much less hairy below and median concavity not as evident; last visible abdominal sternite tridentate. Length 19.5 mm; width 7.4 mm.

Female described from the type of *D. strandtmanni* (J. N. Knull collection, Columbus, Ohio).

V a r i a t i o n : Only two males (including the type) and two females of *D. mutica* were available for study and not much variation aside from sexual was observed. The male homotype (USNM) is virido-aeneous in color while the male type and the females are bronzy-cupreous. The male homotype is slightly smaller than the type being 15.3 mm long, and 5.2 mm wide. The second female is 20.0 mm long and 7.0 mm wide.

T y p e l o c a l i t y : Of *mutica*, New York, Brooklyn, type (MCZ, No. 2664); of *strandtmanni*, Texas, type (J. N. Knull collection, Columbus, Ohio).

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 16): Of the four specimens examined, the type was collected at Brooklyn, N. Y., the male homotype in Maryland, Minne Island, Cabin John, near Washington, D. C., one female also in Maryland, Flag Pond, 3. mi. S. of Kenwood Beach, and the other female was collected in Texas.

H o s t : No data.

F l i g h t p e r i o d : The male homotype from Maryland was collected on 9-V-31 and the female from Maryland on 24-VI-59. No other dates are available.

C o m p a r i s o n s : In general appearance *D. mutica* is most similar to *D. lurida*, *D. obscura*, and *D. juncea* but it differs from all three in the form of the prosternal process, flat to convex in *D. mutica*, concave in the others; and the elytral apices, obliquely truncate in *D. mutica*, bidentate in the others.

25. *Dicerca horni* Crotch (Figs. 17, 32, 41, 82)

Dicerca horni Crotch 1873: 86.

D i a g n o s i s : Robust and moderately convex; virido-brassy to bright cupreous above, more cupreous below; numerous small, black raised areas on elytra, discal striae evident toward suture; elytral apices slightly

prolonged, entire with sutural angles produced or weakly emarginate; mesotibia of male with strong internal tooth (Fig. 32); last abdominal sternite of female entire.

Type locality: California, type (MCZ, No. 5077).

Geographical distribution (Fig. 17): This species is found in the pacific states from British Columbia in Canada to Baja California in Mexico. It has also been taken from the following states: Arizona, Idaho, Nevada, South Dakota, Utah, and Wisconsin. The South Dakota and Wisconsin records may be from mislabelled or accidentally introduced specimens.

Hosts: Breeds in many deciduous shrubs and trees as indicated under the nominal subspecies.

Comparisons: Similar in appearance to *D. cajonensis* and *D. querci* but *D. horni* averages smaller and is less robust; elytral striae are well defined toward the suture in *D. horni*, poorly defined in the other two; the mesotibia of the male bears an acute tooth in *D. horni* (Fig. 32), a blunt tooth in *D. querci*. Also, the lateral margins of the pronotum are more expanded in *D. querci*.

Two subspecies can be recognized.

25a. *Dicerca horni horni* Crotch (Figs. 17, 32, 41, 82)

Dicerca horni Crotch 1873: 86; Kerremans 1892: 87; Fall, 1894, Ent. News, 5: 98; Van Dyke, 1902, Jour. N. Y. Ent. Soc., 10: 172; Kerremans 1903: 131; Wright & Coolidge, 1908, Ent. News, 19: 67; Casey 1909: 153; Woodworth 1913: 196; Chamberlin 1917 a: 130; Burke, 1917 b, Jour. Econ. Ent., 10: 326; Leng 1920: 180; Chamberlin, 1921, Third Crop Pest & Hort. Rep. 1915—1920, Ore. St. Agr. Exp. Sta., Corvallis, p. 107; 1921, Rev. Appl. Ent. A IX, p. 165; 1924 a: 185; 1925, Pan-Pac. Ent., 1: 186; 1926: 185; Essig 1926: 396; Chamberlin, 1928, Pan-Pac. Ent., 5: 93; Obenberger 1930: 330; Hatch 1938: 185; Beer & Hatch 1941: 104; Van Dyke, 1942, Proc. Calif. Acad. Sci., 24: 114; Keen 1952: 190; Barr 1971: 58.

Dicerca ampliata Casey (subsp. of *horni*) 1909: 153; Chamberlin 1926: 185; Obenberger 1930: 330.

Male: Cupreо-aeneous to virido-aeneous above, more cupreous below. Head flattened, coarsely, rugosely punctured, clothed with white hair; numerous irregular smooth raised areas; vertex with slight median groove; antennae reaching to middle of pronotal sides.

Pronotum with lateral margins subparallel at base and slightly expan-

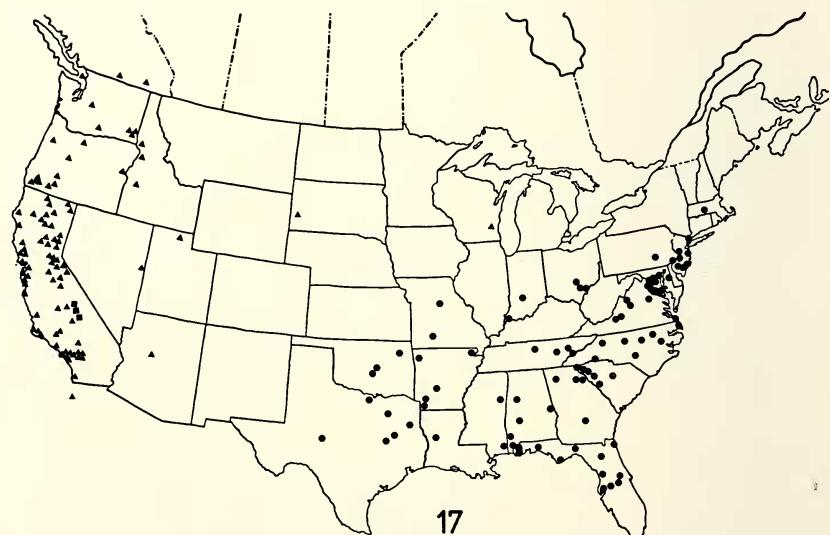
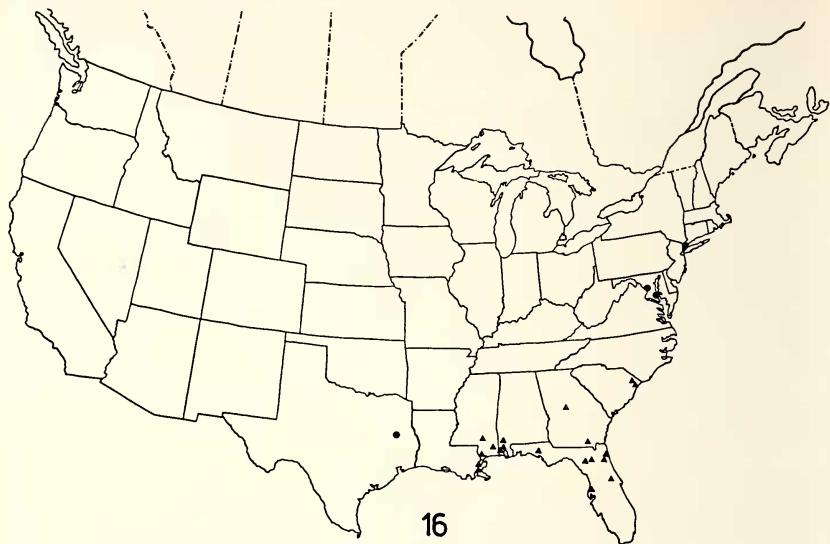


Fig. 16—17: Known geographic ranges of Fig. 16, *Dicerca mutica* LeConte (circles) and *D. juncea* Knull (triangles); Fig. 17, *D. obscura* (Fabricius) (circles), *D. horni* *horni* Crotch (triangles) and *D. horni* *nelsoni* Beer (squares).

ding to before middle, then converging to anterior margin; disk moderately convex, punctures moderate medially, coarse and rugose laterally, white hair moderately long; longitudinal smooth raised areas extending from base to apex next to punctate median channel, another midway to lateral margin interrupted midway by punctured area, some irregular smooth raised areas near lateral margin.

Elytra slightly wider at base than pronotum; lateral margins subparallel to behind middle, then converging to slightly prolonged apices; apices obliquely entire, sutural angle produced; disk with punctured striae evident toward suture, confused laterally, punctured areas sparsely clothed with long white hair, smooth black raised areas of intervals small, intervals carinate apically.

Venter coarsely punctate laterally, with smooth sparsely punctate areas bordering punctate median concave channel, concavity extending from prosternum to second abdominal sternite; prosternum with transverse impression near anterior margin; punctate areas with moderately long white hair; mesotibia with acute internal spine; last abdominal sternite emarginate.

Male genitalia similar to those of *D. querki* (Fig. 63) except sides of parameres are slightly more parallel toward apex.

Length 15.0 mm; width 5.5 mm.

Redescribed from a male homotype in the writer's collection from California, Millcreek, 14 miles northeast of Redlands, 4000 feet.

F e m a l e : Differs from male in lacking mesotibial tooth and having last visible abdominal sternite entire or trilobed.

V a r i a t i o n : This species, which appears to have a wide selection of food plants, shows considerable variation. The general brassy-cupreous color varies to dark cupreous-black, or exhibits strong virescent tints. The median punctate channel of the pronotum is partially obliterated in some specimens, and the last visible abdominal sternite of the female, usually entire, is trilobate in occasional specimens. The males vary from 9.5 to 20.0 mm long and from 3.9 to 7.5 mm wide; the females from 11.0 to 22.0 mm long and from 4.3 to 8.0 mm wide.

T y p e l o c a l i t y : Of *horni*, California, type (MCZ, No. 5077); of *ampliata*, California, Kaweah, type (Casey collection, USNM).

G e o g r a p h i c a l d i s t r i b u t i o n (Fig. 17): From 952 specimens examined. This species is most common in the Pacific coast area and has been taken in the following states. Canada: British Columbia. United States: Arizona, California, Idaho, Nevada, Oregon, South Dakota, Utah,

Washington, and Wisconsin. Mexico: Baja California. The South Dakota and Wisconsin records may be from mislabelled specimens, or accidentals.

Host : From material examined *D. horni* has been reared from dead branches of *Rhamnus californica* Eschscholtz and English Walnut. Also it has been collected on the following: *Rhus* sp., damaging plums, *Ceanothus cuneatus* (Hooker), *C. crassifolius* Torrey, *C. obliquatus (divaricata)* Nuttall, *C. thyrsiflorus* Eschscholtz, *C. integrifolius* Hooker and Arnott, *Salix exigua* Nuttall, *Alnus rhombifolia* Nuttall, *A. oregona* Nuttall, *Cercocarpus ledifolius* Nuttall, *C. betuloides* Nuttall, *Quercus wislizenii* Candolle, and *Symporicarpos* sp.

Flight period : Collected throughout the year.

25b. *Dicerca horni nelsoni* Beer

Dicerca horni nelsoni Beer, 1974, Coleopt. Bull., 28 (1): 49.

This subspecies differs from *D. b. horni* chiefly in its color which is bright cupreous above and below; and mesotibial spine tending to be shorter and more blunt.

Male genitalia as in *D. b. horni*.

Length (holotype) 18.8 mm; width 6.5 mm.

Female : Differs from male as in *D. b. horni*.

Variation : Some specimens are more deeply cupreous than others and some are more robust. In size they vary from the smallest male, length 14.9 mm, width 5.3 mm to the largest female, length 21.9 mm, width 8.0 mm.

Type locality : Holotype from California, Inyo County, Cottonwood Creek, east flank of Sierra-Nevada Range (CAS).

Geographical distribution (Fig. 17): Known only from California, Inyo County.

Host : Collected on *Betula* sp.

Flight period : Collected from May 6 to July 7.

26. *Dicerca cajonensis* Knoll (Fig. 20)

Dicerca cajonensis Knoll (subsp. of *querci*) 1944: 90, Pl. 1, Fig. 8; Blackwelder & Blackwelder 1948: 20.

Diagnosis : Large, robust; dark bronzy black above and below; upper surface finely, cunfluently punctate; pronotum with lateral margins

subparallel for basal two-thirds, then converging to anterior angles; elytra with scattered small smooth raised areas; last ventral abdominal segment shallowly, bluntly trilobed.

F e m a l e : Head flat, densely moderately coarsely punctured with irregular longitudinal raised areas on front and vertex; eyes more broadly separated below than above; antennae slender, reaching to just behind middle of pronotum, third segment noticeably longer than second, serrate from fourth distalward.

Pronotum with lateral margins subparallel for basal two-thirds then strongly converging to narrowest at anterior angles; anterior and posterior margins sinuate; disk densely, moderately coarsely punctured; longitudinal, smooth raised areas on either side of median punctate area (slightly depressed) from base to anterior margin, small median one, one midway to lateral margin broadly interrupted by punctate area, a few irregular raised areas at lateral margin; triangular basal depression in front of scutellum and another basal depression on each side half way to lateral margin.

Elytra but slightly wider than pronotum; subparallel for basal half then rounded and strongly converging to slightly produced elytral apices; apices obliquely truncate, slightly produced at sutural margin; disk finely, confluently punctate with scattered smooth raised areas.

Venter with prosternum coarsely, rugosely punctured; prosternal process concave, margined by smooth ridges; meso- and metasterna smooth medially and coarsely, confluently punctured laterally, with median concavity; abdomen coarsely, rugosely punctured, punctures less dense medially where each segment is variously depressed; protibia straight, mesotibia slightly arcuate, metatibia arcuate; last visible abdominal sternite trilobed (Fig. 20).

Length 20.5 mm; width 8.5 mm.

Redescribed from female holotype (J. N. Knull collection, Columbus, Ohio).

M a l e : Unknown, but there is a male in the J. R. Helfer collection (CAS) that possibly represents the male of this species, or it may be an aberrant example of *D. horni*. The mesotibia has an internal dilation but no tooth; the elytral striae are more evident than on the type of *D. cajonensis*. Length 15.5 mm; width 6.5 mm.

V a r i a t i o n : The female holotype is the only specimen known for certain.

T y p e l o c a l i t y : California, San Bernardino County, Cajon Pass, type (J. N. Knull collection, Columbus, Ohio).

Geographical distribution: Known only from the type locality in southern California.

Host: The type was taken on *Quercus* sp.

Flight period: Holotype taken 8-VI-40.

Comparisons: This species was originally described as a sub-species of *D. querci* but the differences appear to be of specific importance. The pronotal margins are distinctly expanded in *D. querci*, while in *D. cajonensis* they are subparallel on the basal two-thirds, then strongly rounded to apex; the surface of the elytra is more finely confluent punctate and smooth callosities less numerous in *D. cajonensis*. Comparison with *D. horni* is given under that species.

27. *Dicerca querci* Knull (Figs. 18, 29, 63)

Dicerca querci Knull 1941: 694, 695, Pl. 1, Fig. 3; Blackwelder & Blackwelder 1948: 20.

Diagnosis: Large, robust; dark cupreous-brown above and below; clothed throughout with long white hair; third antennal segment distinctly longer than second; lateral margins of pronotum obtusely angulated at anterior three-fifths; elytra with longitudinal rows of small black raised areas; apices moderately produced and obliquely truncate; mesotibia of male with an obtuse internal tooth (Fig. 29); last visible abdominal sternite of female entire or feebly trilobed.

This species is well described by Knull (1941).

Male genitalia (Fig. 63).

Variation: Fairly uniform in appearance with some specimens a little more cupreous than usual. The males vary from 17.0 to 22.0 mm long and from 6.0 to 8.0 mm wide; the females from 20.0 to 25.0 mm long and from 7.5 to 10.5 mm wide.

Type locality: California, Santa Rosa Mountains, Pinyon Flat, type (J. N. Knull collection, Columbus, Ohio).

Geographical distribution (Fig. 18): From 42 specimens examined, collected from the scrub oak regions of Riverside, and San Diego counties in southern California.

Host: Reared from *Quercus dumosa* Nuttall.

Flight period: Collected from May 24 to July 8.

Comparisons: Similar to *D. horni* and *D. cajonensis* and the differences are discussed under each of those species.

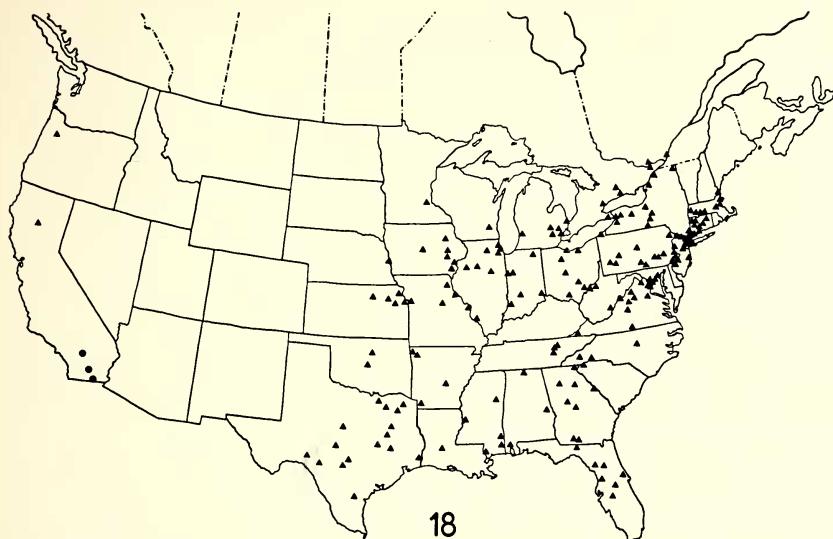


Fig. 18. Known geographic ranges of *Dicerca lurida* (Fabricius) (triangles) and *D. querci* Knoll (circles).

Legends to the following figures

Figs. 19—32: Fig. 19. Last visible abdominal sternite of female *Dicerca tenebrosa tenebrosa* (Kirby), Fig. 20. Same for *D. cajonensis* Knull, Fig. 21. Same for *D. mutica* LeConte. Fig. 22. Same for *D. sexualis* Crotch; Fig. 23. Elytral apices of *D. lurida* (Fabricius), Fig. 24. Elytral apices of *D. tenebrosa knulli* Nelson; Fig. 25. Right metacoxal plate of *D. obscura* (Fabricius), Fig. 26. Right metacoxal plate of *D. lurida* (Fabricius); Fig. 27. Mesotibia of male *D. callosa frosti* Nelson, Fig. 28. Mesotibia of male *D. sexualis* Crotch, Fig. 29. Mesotibia of male *D. querci* Knull, Fig. 30. Mesotibia of male *D. tenebrica* (Kirby), Fig. 31. Mesotibia of male *D. tenebrosa tenebrosa* (Kirby), Fig. 32. Mesotibia of male *D. horni horni* Crotch. Line = 3 mm.

Figs. 33—41: Fig. 33. Antecoxal piece of *Dicerca tenebrica* (Kirby), Fig. 34. Antecoxal piece of *D. hesperoborealis* Hatch & Beer, Fig. 35. Antecoxal piece of *D. divaricata* (Say); Fig. 36. Antenna of *D. tenebrosa tenebrosa* (Kirby), Fig. 37. Antenna of *D. callosa callosa* Casey, Fig. 38. Antenna of *D. callosa frosti* Nelson, Fig. 39. Antenna of *D. pugionata* (Germar), Fig. 40. Antenna of *D. mutica* LeConte, Fig. 41. Antenna of *D. horni horni* Crotch. Lines = 2 mm.

Figs. 42—45: Dorsal and ventral views of the male genitalia of: Fig. 42, *Dicerca tenebrosa tenebrosa* (Kirby); Fig. 43, *D. crassicollis* LeConte; Fig. 44, *D. sexualis* Crotch; Fig. 45, *D. lugubris* LeConte. Line = 2 mm.

Figs. 46—50: Dorsal and ventral views of the male genitalia of: Fig. 46, *Dicerca punctulata* Schönheer; Fig. 47, *D. dumolini* (Laporte & Gory); Fig. 48, *D. tuberculata* (Laporte & Gory); Fig. 49, *D. pectorosa* LeConte; Fig. 50, *D. callosa callosa* Casey. Line = 2 mm.

Figs. 51—54: Dorsal and ventral views of the male genitalia of: Fig. 51, *Dicerca tenebrica* (Kirby); Fig. 52, *D. hesperoborealis* Hatch & Beer; Fig. 53, *D. divaricata* (Say); Fig. 54, *D. caudata* LeConte. Line = 2 mm.

Figs. 55—59: Dorsal and ventral views of the male genitalia of: Fig. 55, *Dicerca pugionata* (Germar); Fig. 56, *D. lepida* LeConte; Fig. 57, *D. asperata* (Laporte & Gory); Fig. 58, *D. spreta* (Gory); Fig. 59, *D. juncea* Knull. Line = 2 mm.

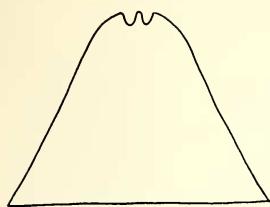
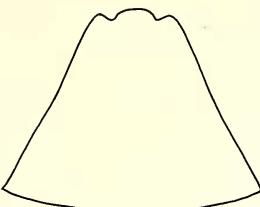
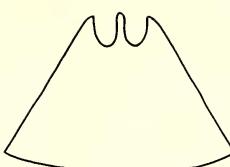
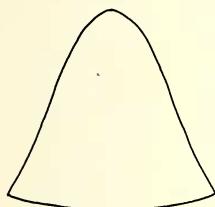
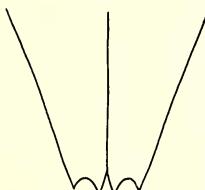
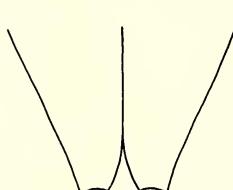
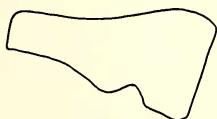
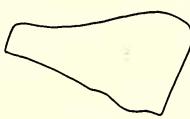
Figs. 60—63: Dorsal and ventral views of the male genitalia of: Fig. 60, *Dicerca obscura* (Fabricius); Fig. 61, *D. lurida* (Fabricius); Fig. 62, *D. mutica* LeConte; Fig. 63, *D. querci* Knull. Line = 2 mm.

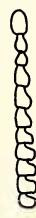
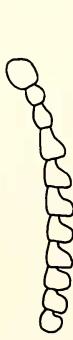
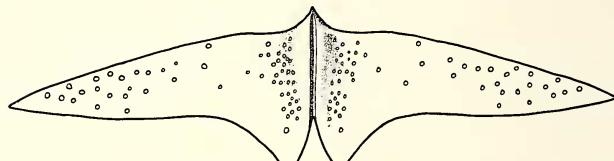
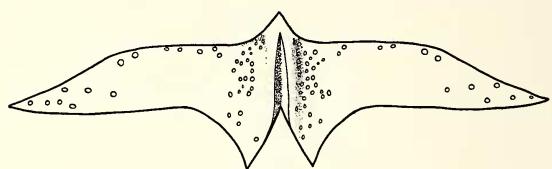
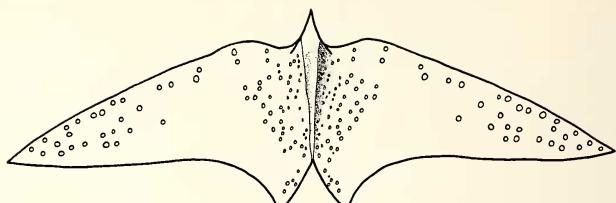
Figs. 64—69: Dorsal views of: Fig. 64, *Dicerca tenebrosa tenebrosa* (Kirby); Fig. 65, *D. crassicollis* LeConte; Fig. 66, *D. sexualis* Crotch; Fig. 67, *D. dumolini* (Laporte & Gory); Fig. 68, *D. punctulata* (Schönheer); Fig. 69, *D. lugubris* LeConte. Line = 5 mm.

Figs. 70—75: Dorsal views of: Fig. 70, *Dicerca tuberculata* (Laporte & Gory); Fig. 71, *D. pectorosa* LeConte; Fig. 72, *D. callosa callosa* Casey; Fig. 73, *D. callosa frosti* Nelson; Fig. 74, *D. hesperoborealis* Hatch & Beer; Fig. 75, *D. caudata* LeConte. Line = 5 mm.

Figs. 76—81: Dorsal views of: Fig. 76, *Dicerca tenebrica* (Kirby); Fig. 77, *D. divaricata* (Say); Fig. 78, *D. pugionata* (Germar); Fig. 79, *D. lepida* LeConte; Fig. 80, *D. spreta* (Gory); Fig. 81, *D. asperata* (Laporte & Gory). Line = 5 mm.

Figs. 82—86: Dorsal views of: Fig. 82, *Dicerca horni horni* Crotch; Fig. 83, *D. mutica* LeConte; Fig. 84, *D. juncea* Knull; Fig. 85, *D. obscura* (Fabricius); Fig. 86, *D. lurida* (Fabricius). Line = 5 mm.

**19****20****21****22****23****24****25****26****27****28****29****30****31****32**



GHD



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NHC

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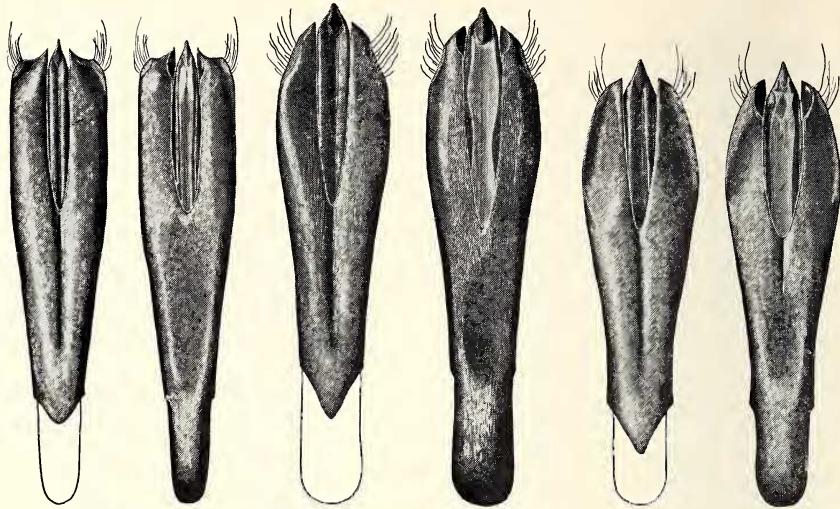
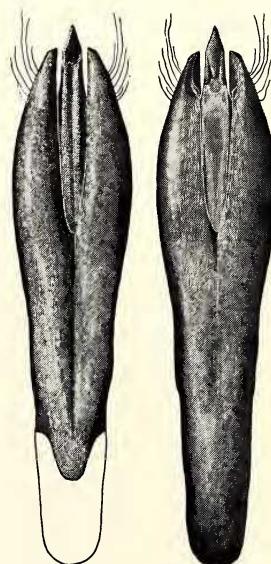


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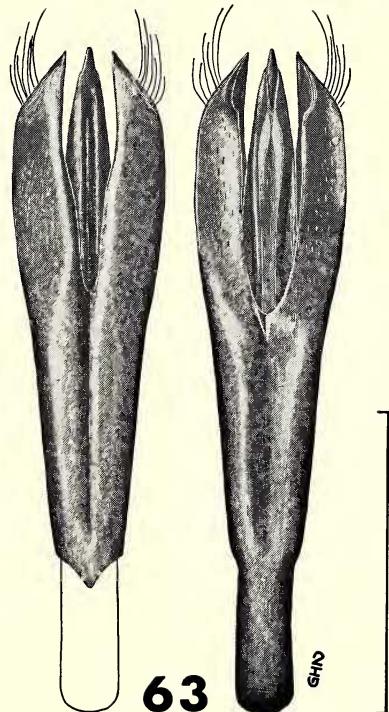
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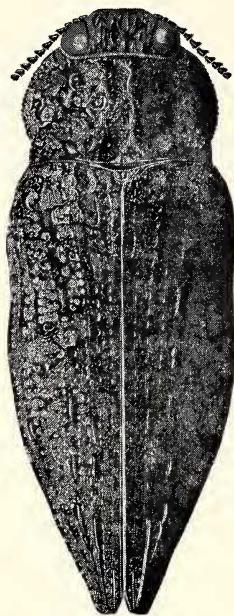
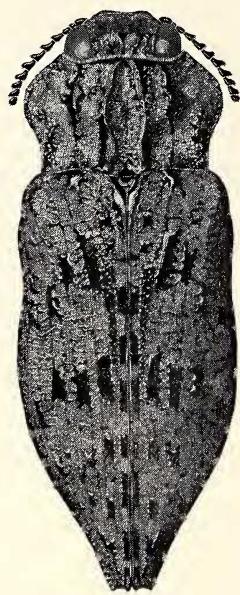
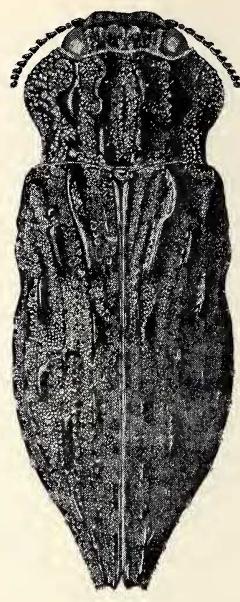
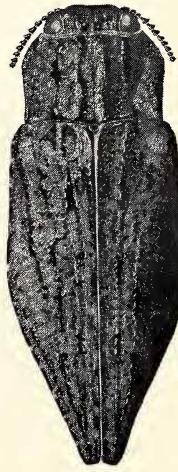
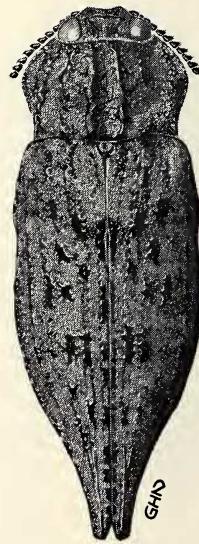
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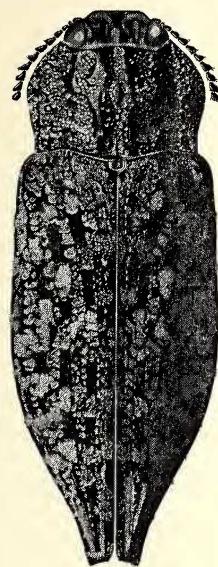
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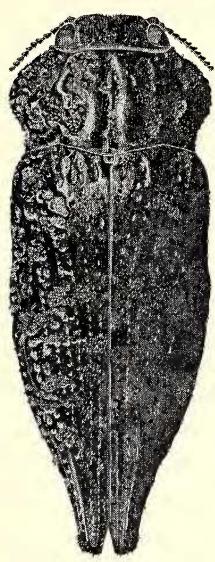
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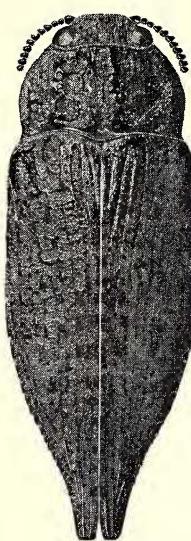
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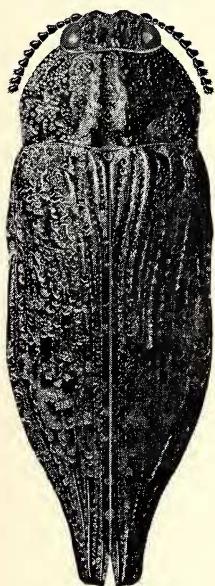
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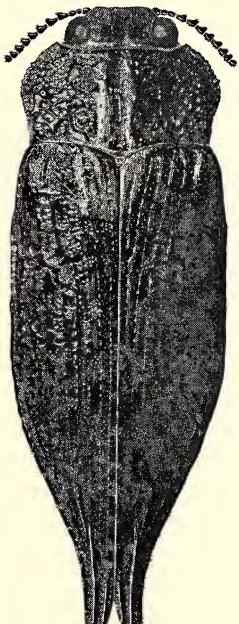
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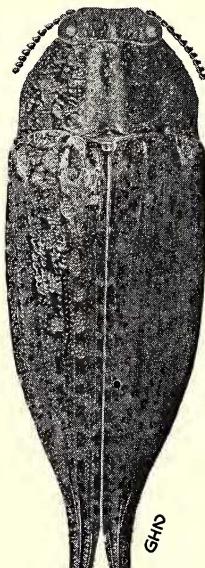
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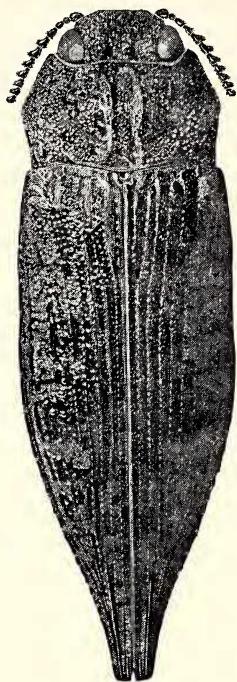
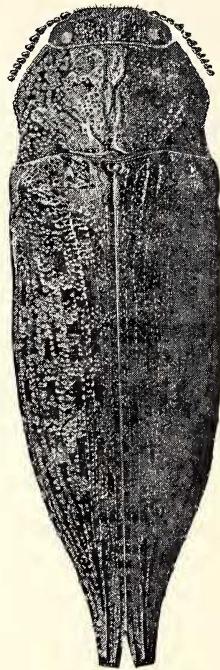
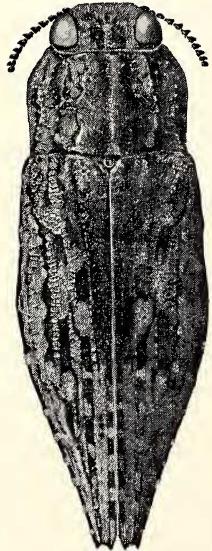
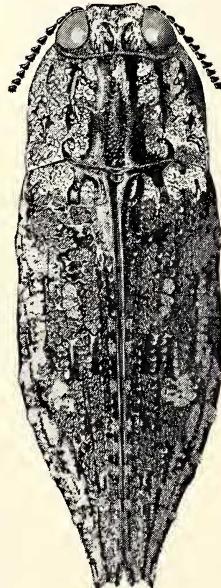


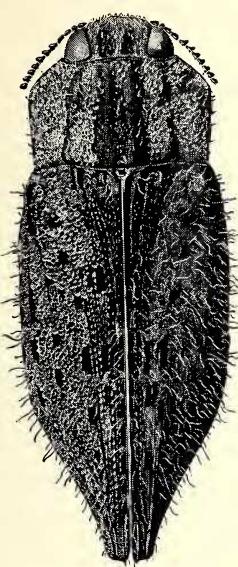
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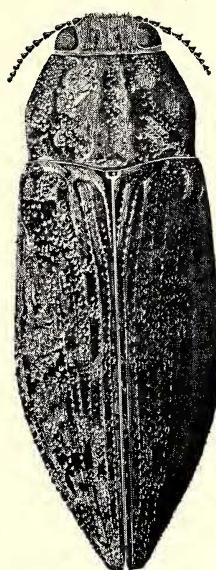
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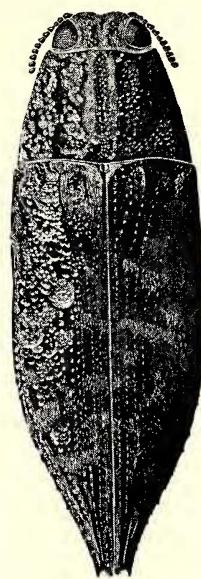
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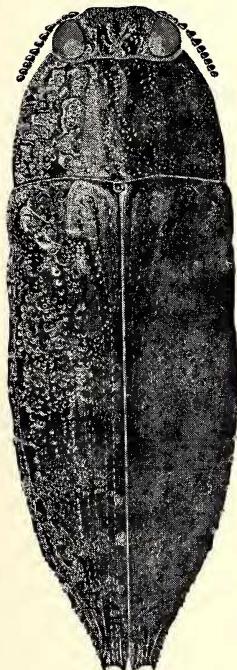
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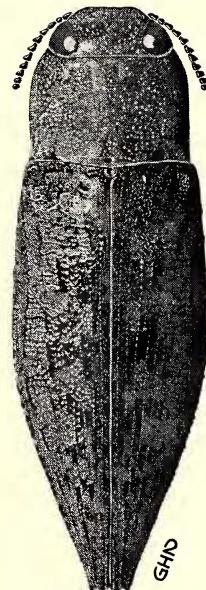
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